

**Final Environmental Assessment
E-2/C-2 Field Carrier Landing Practice
Operations at Emporia-Greenville Regional
Airport, Greenville County, Virginia, and
National Aeronautics and Space
Administration Wallops Flight Facility,
Accomack County, Virginia**

January 2013



Department of the Navy



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Lead Agency:
United States Department of the Navy



Cooperating Agencies:
Federal Aviation Administration
National Aeronautics and Space Administration

In accordance with Chief of Naval Operations Instructions 5090.1C, Change 1

FINAL ENVIRONMENTAL ASSESSMENT
E-2/C-2 FIELD CARRIER LANDING PRACTICE OPERATIONS AT
EMPORIA-GREENSVILLE REGIONAL AIRPORT,
GREENSVILLE COUNTY, VIRGINIA, AND
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WALLOPS FLIGHT FACILITY, ACCOMACK COUNTY, VIRGINIA
January 2013

Abstract

This environmental assessment (EA) evaluates the potential environmental consequences of the U.S. Department of the Navy's (Navy's) proposed action to conduct regular, scheduled E-2C Hawkeye, E-2D Advanced Hawkeye, and C-2A Greyhound (E-2/C-2) Field Carrier Landing Practice (FCLP) operations at a local airfield (for the purposes of this document, local is defined as within 90 nautical miles of Naval Station (NS) Norfolk Chambers Field, in Norfolk, Virginia). The Navy proposes to use the facilities at either Emporia-Greensville Regional Airport (Emporia-Greensville) or at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) until the Navy addresses local FCLP capacity shortfalls on a more permanent basis. The proposed action would support FCLP operations for E-2/C-2 squadrons operating from NS Norfolk Chambers Field. This EA analyzes the environmental consequences associated with both the proposed FCLP operations and minor modifications to airfield facilities to support the FCLP operations. The Navy is the lead agency for this proposed action, and the Federal Aviation Administration and NASA are serving as cooperating agencies.

This EA evaluates two action alternatives for conducting E-2/C-2 FCLP operations, as well as the No Action Alternative. The two action alternatives include up to 45,000 annual operations at Emporia-Greensville (Alternative 1) and up to 45,000 annual operations at WFF (Alternative 2). Under the No Action Alternative, the Navy would continue to utilize Naval Auxiliary Landing Field (NALF) Fentress as the primary local airfield for E-2/C-2 FCLP training requirements. Under the No Action Alternative, pilot proficiency would be maintained; however, the Navy would continue to need to conduct FCLP training into the late-night and early morning hours at NALF Fentress, would continue to need to conduct FCLP training at alternative airfields such as Naval Air Station Oceana, and would continue to need to conduct E-2/C-2 FCLP training detachments outside the local area (e.g., Navy Outlying Landing Field Whitehouse, near NAS Jacksonville, Florida).

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Executive Summary

ES.1 Introduction

This environmental assessment (EA) evaluates the potential environmental consequences of the U.S. Department of the Navy's (the Navy's) proposed action to conduct regular, scheduled E-2C Hawkeye, E-2D Advanced Hawkeye, and C-2A Greyhound (E-2/C-2) Field Carrier Landing Practice (FCLP) operations at a local airfield that meets the Navy's minimum airfield requirements. For the purposes of this document, local is defined as within 90 nautical miles of Naval Station (NS) Norfolk Chambers Field, in Norfolk, Virginia. The Navy proposes to use the facilities at either Emporia-Greensville Regional Airport (Emporia-Greensville) or at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) until the Navy addresses local FCLP capacity shortfalls on a more permanent basis. The proposed action would support FCLP operations for E-2/C-2 squadrons operating from NS Norfolk Chambers Field, in Norfolk, Virginia. This EA analyzes the environmental consequences associated with both the proposed FCLP operations and minor modifications to airfield facilities to support the FCLP operations. In accordance with 40 Code of Federal Regulations (CFR) 1501.6, the FAA and NASA are serving as cooperating agencies because their specific expertise is needed to ensure adequate evaluation of the potential environmental effects associated with Navy's proposed action within each agency's jurisdiction.

ES.2 Project Purpose and Need

The purpose of the proposed action is to provide additional local FCLP training capacity for E-2/C-2 squadrons operating from NS Norfolk Chambers Field. Naval Auxiliary Landing Field (NALF) Fentress, the single, local FCLP outlying landing field (OLF) supporting two major naval air installations, Naval Air Station (NAS) Oceana and NS Norfolk Chambers Field, provides the only dedicated local FCLP training environment specifically for meeting both fleet squadron and Fleet Replacement Squadron (FRS) FCLP requirements for three airframes (FA-18, E-2, and C-2). NALF Fentress lacks the capacity to support local E-2/C-2 FCLP training requirements under all operational conditions. As a result, FCLP training is routinely conducted at NALF Fentress during late-night and early morning hours (from 10:00 p.m. to 7:00 a.m.). Having only one OLF to support two major naval air installations can also result in periodic FCLP training capacity shortfalls, necessitating the use of alternative FCLP-equipped airfields, such as Naval Outlying Landing Field (NOLF) Whitehouse, Florida, and NAS Oceana.

ES.3 Proposed Action and Alternatives Considered

ES.3.1 Proposed Action

The proposed action is to acquire the use of an additional local airfield to support FCLP for E-2/C-2 squadrons operating from NS Norfolk Chambers Field. The proposed action also includes minor modifications to the airfield infrastructure to support FCLP operations.

Operations

During FCLP, pilots perform repetitive “touch-and-go” landings at airfields, which simulate landing on an aircraft carrier. FCLP is defined as that phase of required flight training that precedes carrier landing operations. It should simulate, as nearly as practicable, the conditions encountered during carrier landing operations (U.S. Department of the Navy 2009a). Pilots of E-2/C-2 aircraft need to be both current and proficient in carrier-landing qualification. The skills required to complete carrier landings must be routinely practiced by pilots of all experience levels to maintain the requisite level of proficiency. In order to do that, pilots conduct FCLP.

To meet FCLP requirements, the E-2/C-2 squadrons operating from NS Norfolk Chambers Field would need to conduct up to 45,000 annual operations. With each operation being a separate action, the 45,000 operations include 20,000 FCLP passes, where one FCLP pass consists of two operations: a landing or low approach followed by an immediate takeoff or climb-out. Arrivals and departures to and from the airfield, as well as holding patterns, account for the remaining 5,000 operations. In response to public comments on the Draft EA, the two holding pattern locations for both alternatives were reduced to only one pattern location, with the pattern altitude elevated to at or above 3,500 feet above ground level, instead of 2,000 feet. These adjustments reduce potential aircraft noise associated with the Navy’s proposed action and minimize noise over more populated areas.

E-2/C-2 squadrons typically conduct FCLP operations during a three-hour period and can conduct these periods up to twice per day (one day and one night period). “Night” is defined as flying after sunset and, at times during the year, could begin as early as 5:30 p.m. Depending on scheduling and training requirements, operations can be conducted between 15 and 20 days in a given month, throughout the year. While the overall average annual requirement would remain the same, there could be periods of increased use followed by periods of little or no use.

FCLP training requires the installation of visual landing aids adjacent to the landing area. During FCLP training, the airfield’s active runway would be closed to non-Navy aircraft, generally precluding concurrent operations, such as civilian aviation, crop dusting, skydiving, sport or glider flying, and similar airfield operations. However, the pattern would be opened to emergency aircraft, as necessary.

No aircraft or squadron personnel would be permanently stationed or homebased at the airfield. During FCLP periods, Norfolk-based Navy personnel would be present to observe and grade the pilots conducting the training operations.

Airfield Requirements

The airfield used must be within a maximum aircraft transit distance of 90 nautical miles from NS Norfolk Chambers Field. The minimum runway length must be equal to or greater than 5,000 feet, and the minimum runway width must be equal to or greater than 100 feet.

To facilitate E-2/C-2 FCLP operations, simulated carrier decks, concrete pads for Navy equipment, a storage area, and electrical power would need to be installed or available at the chosen airfield as part of the proposed action.

Project Schedule and Duration of the Action

Construction would be scheduled to be completed by July 2013 with initial operating capability shortly thereafter. The potential term for this action could be 10 years.

ES.3.2 Alternatives Considered

This EA evaluates two action alternatives for conducting E-2/C-2 FCLP operations, as well as the No Action Alternative.

Alternative 1: Emporia-Greensville Regional Airport

Emporia-Greensville is 65 nautical miles from NS Norfolk Chambers Field. The single runway at Emporia-Greensville, Runway 15/33, is 5,010 feet long and 100 feet wide. Emporia-Greensville is primarily located within Greensville County, Virginia, with the approach end of Runway 33 located in Southampton County. The entrance to Emporia-Greensville is 1.4 miles east of the city limits of the City of Emporia, Virginia.

Under Alternative 1, the Navy would conduct up to 45,000 E-2/C-2 FCLP operations annually at Emporia-Greensville. Approximately half of the proposed Navy E-2/C-2 training at Emporia-Greensville Regional Airport would be conducted during daylight hours and half during hours of darkness. For purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours and would end as soon as possible. Because sunset occurs later during the long daylight hours of the summer months, FCLP training that begins after sunset may continue as late as 1:00 a.m., or later.

Two operational scenarios are evaluated: Scenario 1 would include an FCLP pattern with three planes conducting a total of up to 45,000 operations, and Scenario 2 would include up to 30,000 operations conducted using a five-plane FCLP pattern and up to 15,000 operations conducted using a three-plane FCLP pattern. As provided in the Navy's Request for Proposals, the Navy would prefer to operate according to Scenario 2, i.e., the three- and five-plane patterns, which would allow for greater training flexibility.

Alternative 2: Wallops Flight Facility Main Base

WFF Main Base is 70 nautical miles from NS Norfolk Chambers Field, located on the Eastern Shore of Virginia 5 miles west of Chincoteague, Virginia. The airfield has three runways, two of which meet the Navy's length requirement and could support E-2/C-2 FCLP operations. Runway 04/22 is 8,750 feet by 150 feet, and Runway 10/28 is 8,000 feet by 200 feet. Runway 17/35, at 4,820 feet, does not meet the Navy's length requirement (5,000 feet) and is not being considered.

Under Alternative 2, the Navy would conduct up to 45,000 E-2/C-2 FCLP operations annually at WFF Main Base. Approximately half of the proposed Navy E-2/C-2 training at NASA Wallops Flight Facility would be conducted during daylight hours and half during hours of darkness. For purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours, and would end as soon as possible. Because sunset occurs late during the long daylight hours of the summer months, FCLP training that begins after sunset may continue as late as 1:00 a.m., or later. Aircraft refueling and overnight detachments could occur at WFF Main Base if this alternative is chosen.

Two scenarios are analyzed in this EA for WFF Main Base. Scenario 1 would include use of Runway 04/22 for both day and night operations, while Scenario 2 would include use of Runway 10/28 for both day and night operations. Night is defined as flying after sunset and, at times during the year, could begin as early as 5:30 p.m. FCLP could also be conducted on both runways during the daytime only. Two of the four runway ends at WFF would be utilized for E-2/C-2 FCLP operations if operations were to be conducted during the day and at night (i.e., under either Scenario 1 or Scenario 2); however, daytime-only FCLP operations could be conducted on up to four runway ends. This option (conduct daytime operations on four runway ends) is covered under the analysis for Scenarios 1 and 2 for WFF.

For WFF Main Base, this EA evaluates a combination of three- and five-plane FCLP patterns, in which up to 30,000 operations would be conducted using a five-plane FCLP pattern and up to 15,000 operations would be conducted using a three-plane FCLP pattern, for a total of up to 45,000 operations annually.

ES.3.3 No Action Alternative

Under the No Action Alternative, the Navy would not use the airfield facilities at Emporia-Greenville or WFF Main Base for E-2/C-2 FCLP. E-2/C-2 squadrons operating from NS Norfolk Chambers Field would continue to utilize NALF Fentress as the primary local airfield for E-2/C-2 FCLP training requirements. Under the No Action Alternative, pilot proficiency would be maintained; however, the Navy would continue to need to conduct FCLP training into the late-night and early morning hours at NALF Fentress, occasionally conduct FCLP training at alternative airfields such as NAS Oceana, and conduct E-2/C-2 FCLP training detachments outside the local area (e.g., NOLF Whitehouse, near NAS Jacksonville, Florida).

ES.4 Environmental Consequences of the Proposed Action

The potential environmental impacts of Alternative 1 and Alternative 2 are summarized below. The No Action Alternative is summarized in Section ES.5 with a further description of the baseline in Section 2.2.3.

ES.4.1 Aircraft Operations and Airspace

Alternative 1: Emporia-Greenville Regional Airport

Current air traffic in the vicinity of Emporia-Greenville, a public airport, is associated with transient civilian and military overflights, victor airways, military training routes, and emergency patient transport to the Greenville Memorial Hospital heliport. Under this alternative, the runway would be closed to non-FCLP arrivals and departures, except in the case of an emergency. During the FCLP period, there would be minor airspace impacts on civilian flights, as well as military rotary-wing and propeller aircraft training, because non-participating aircraft would not be able to utilize the runway; however, no permanent airspace designations would change as a result of the Navy's proposed action. Therefore, there would be no significant impact on aircraft operations and/or airspace at Emporia-Greenville.

Alternative 2: Wallops Flight Facility Main Base

Current air traffic in the vicinity of WFF Main Base, a federally owned airport that does not allow public access, is associated with NASA flights and military flights. Under this alternative, the WFF Main Base runway being used for Navy FCLP would be closed to non-participating aircraft except in the case of an emergency. The Navy would coordinate with WFF Main Base air traffic control to schedule FCLP and supply a tentative schedule in advance so that aircraft based at the airfield could schedule accordingly. No permanent airspace designations would change as a result of the Navy's proposed action. Therefore, there would be no significant impact on civilian aircraft use of the airspace or on aircraft operations at WFF Main Base.

ES.4.2 Safety

Alternative 1: Emporia-Greenville Regional Airport

There would be no change to the runway protection zones (RPZs) and associated land use controls at Emporia-Greenville as a result of the Navy's proposed action. Standard air traffic management techniques would be employed during times of Navy FCLP. Emporia-Greenville airport staff will issue a Notice to Airmen (NOTAM) announcing the closure of the airfield during FCLP operations. The airfield universal communications (UNICOM) frequency will be monitored continuously during FCLP operations. Any non-FCLP aircraft approaching the airfield will be informed of the airfield status and directed to remain clear. Given the measures put in place to minimize interaction with private aircraft during FCLP operations, the risks of an aviation mishap occurring during FCLP operations under Alternative 1 would be minimized.

An increase in the number of air operations at Emporia-Greenville could result in a minor increase in the probability of a Bird/Animal Aircraft Strike Hazard (BASH) incident. BASH management would be provided by the airfield or through a third-party services contract, as needed. An aircrew flying in and around Emporia-Greenville would adhere to flight operations standard operating procedures, using resources such as personnel on the ground to minimize BASH exposure during higher risk times of day or migration seasons. As a result of standard flight operating procedures and implementation of airfield or third-party contractor BASH measures, as needed, BASH risk would be managed and would be expected to be low. Additionally, the altitude of the Navy's proposed holding pattern has been elevated to at or above 3,500 feet to further mitigate the BASH risk. Therefore, there would be no significant impact related to BASH potential under Alternative 1. In conclusion, implementation of Alternative 1 would not have a significant impact on airfield safety zones or airfield safety.

Alternative 2: Wallops Flight Facility Main Base

The clear zones and potential accident zones for Runways 04/22, 10/28, and 17/35 at WFF Main Base were established by NASA and are published in NASA's master plan. There would be no change to the clear zones or potential accident zones or the land that lies beneath these zones as a result of the Navy's proposed action. Standard air traffic management techniques would be employed during times of Navy FCLP. WFF Main Base will issue a NOTAM announcing the status of FCLP operations at the airfield. The airfield has an air traffic control tower, which will direct approaching non-FCLP aircraft as necessary. Given the measures put in place to minimize interaction with other aircraft during FCLP operations, the risks of an aviation mishap occurring during FCLP operations under Alternative 2 would be minimized.

WFF has a robust BASH management program that has established procedures, which would be adhered to and expanded upon, as needed, that would assist in managing any potential increase in the risk of bird/animal-aircraft interactions. An aircrew flying in and around WFF Main Base would adhere to the facility's flight operations standard operating procedures, using resources such as communication with the control tower to minimize exposure during higher risk times of day or migration seasons. Additionally, the altitude of the Navy's proposed holding pattern has been elevated to at or above 3,500 feet to further mitigate the BASH risk. Therefore, there would be no significant impact related to BASH potential under Alternative 2. In conclusion, implementation of Alternative 2 would not have a significant impact on airfield safety zones or airfield safety.

ES.4.3 Air Quality**Alternative 1: Emporia-Greenville Regional Airport****Alternative 2: Wallops Flight Facility Main Base**

Both Emporia-Greenville and WFF Main Base are located in regions that are in attainment for the National Ambient Air Quality Standards, or unclassified for all criteria pollutants. Therefore, the proposed action under either alternative would be exempt from federal and state General Conformity regulations. Both

temporary construction emissions and annual operating emissions would be below 250 tons per year for all criteria emissions and therefore would have no significant impact on air quality in the region.

ES.4.4 Noise

Alternative 1: Emporia-Greensville Regional Airport

The increase in land area falling under the Day-Night Average Sound Level (DNL) due to the proposed Navy E-2/C-2 operations would equate to 40.5 acres and 44.0 acres within the greater than 65 decibel (dB) DNL noise zone for Scenarios 1 and 2, respectively. In both cases, this would impact approximately three individuals in Greensville County (i.e., approximately 0.02 percent of the total county population). As a supplemental noise metric, a Sound Exposure Level (SEL) analysis was also calculated, which evaluates the estimated noise experienced at the points of interest from single aircraft events. Fewer than half of the points of interest would experience higher maximum modeled SEL values compared to existing conditions.

Although noise levels would increase at Emporia-Greensville under Alternative 1, under both scenarios, there would be no significant noise impacts for either scenario. The 70 dB DNL noise contour would be wholly contained within the Emporia-Greensville airport property, and only one residence would be located above 65 dB DNL. Additionally, noise generated from the Navy's proposed action would be temporary and intermittent, and the noise would be consistent with the existing uses of the airport, including existing military operations (helicopter noise). The two identified holding patterns have been reduced to only one for each alternative, with the pattern altitude elevated to at or above 3,500 feet instead of 2,000 feet. These adjustments reduce potential aircraft noise associated with the Navy's proposed action and minimize noise over more populated areas. Therefore, there would be no significant noise impact under Alternative 1 for either scenario.

As any proposed airport design changes for the Emporia-Greensville Regional Airport as a result of this proposed action are subject to FAA approval, the FAA has been invited to participate in the analysis of Alternative 1 as a cooperating agency. For the purpose of supporting the FAA's action, the analysis of Alternative 1 has been expanded to include specific FAA requirements for airports under their oversight. For FAA-regulated airports, FAA policy designates the 65 dB DNL contour as the cumulative noise exposure level above which residential land uses are not considered compatible. Based on the land use compatibility analysis, local land use controls, and comments received from the FAA, one residence is identified within the proposed 65 dB DNL noise zone near Emporia-Greensville for either scenario under Alternative 1. Prior to taking action, the FAA requires the land use designation for this property be changed to reflect a non-residential status, and the Emporia-Greensville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use.

Alternative 2: Wallops Flight Facility Main Base

Under Alternative 2 for both Scenarios 1 and 2 at WFF, there would be no significant noise impacts when compared to existing conditions. Only a small percentage of the total population of Accomack County would be impacted by the minor increase in noise around WFF Main Base. The increase in land area within the noise zones due to the proposed Navy E-2/C-2 operations would be approximately 208.7 and 155.1 acres within the greater than 65 dB DNL noise zone for Scenarios 1 and 2, respectively. Under Alternative 2, Scenario 1, there would be an estimated 268 more individuals, or approximately 0.8 percent of the total population in Accomack County, within the greater than 65 dB DNL noise zone. Of this number, 83 more individuals, or approximately 0.3 percent of the total county population, would be within the greater than 70 dB DNL noise zone compared with existing conditions. Under Alternative 2, Scenario 2, there would be an estimated 173 more individuals within the greater than 65 dB DNL noise zone, or approximately 0.5 percent of the total population in Accomack County. Of this number, 14 more individuals, or approximately 0.04 percent of the total population in Accomack County, would be within the greater than 70 dB DNL noise zone compared with existing conditions. All of the identified points of interest currently experience higher maximum modeled SEL values than they would experience under either scenario for Alternative 2.

The majority of individuals that would be impacted by the increase in noise under Alternative 2, Scenario 1 or 2, would be in the Trails End community. Trails End is a private waterfront campground resort, zoned for agricultural use, that was built near the end of the WFF Main Base preexisting active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. The increase in noise would also be temporary and intermittent, and the aircraft operations generating the noise would be consistent with the existing operations at WFF. Additionally, there would not be a significant risk for potential loss of hearing associated with either scenario from the Navy's proposed action at WFF Main Base. The two identified holding patterns have been reduced to only one holding pattern location, with the pattern altitude elevated to at or above 3,500 feet instead of 2,000 feet. These adjustments reduce potential aircraft noise associated with the Navy's proposed action and minimize noise over more populated areas. Therefore, there would be no significant impact from noise as a result of the Navy's implementation of Alternative 2 for either Scenario 1 or 2 at WFF Main Base. Furthermore, there would also be no significant impact from noise if the option of conducting daytime operations on both Runways 04/22 and 10/28 is chosen, as the noise zones for this option would fall within the modeled noise zones for Scenarios 1 and 2.

ES.4.5 Land Use**Alternative 1: Emporia-Greensville Regional Airport**

Under Alternative 1 for both Scenarios 1 and 2, there would be no significant direct or indirect land use impacts when compared to existing conditions at Emporia-Greensville. For Scenarios 1 and 2, an increase of 0.8 acre of land designated as residential land use within the modeled 65 dB DNL or greater noise

zone would be indirectly impacted by the Navy's proposed action. FAR Part 150 designates the DNL 65 dB contour as the cumulative noise exposure level above which residential land uses would not be considered compatible. The Navy would not consider this impact to be significant, and it would not require mitigation by the Navy, given the small size of the area, the current aircraft activity, the general noise environment already present at Emporia-Greenville, and because the noise generated from the Navy's proposed action would be temporary and intermittent. To meet FAA-specific NEPA requirements, the land use designation for this property must be changed to reflect a non-residential status, and the Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use. There are no additional houses, schools, day care centers, or hospitals located within the 65 dB DNL or greater noise zone under either scenario for Alternative 1.

Alternative 2: Wallops Flight Facility Main Base

Under Alternative 2 for both Scenarios 1 and 2, there would be no significant direct or indirect land use impacts when compared to existing conditions at WFF. There would be an increase of 27.6 or 21.9 acres of land designated as residential use within the modeled noise zones for Scenarios 1 and 2, respectively. This increase in residential land area would be located in areas immediately adjacent to the airport property, primarily in the Trails End community, a private waterfront campground resort zoned for agricultural use, which was built near the end of the WFF Main Base preexisting active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. This impact would not be considered a significant impact given that the residential area primarily impacted is a transient and seasonal community, the fact that WFF Main Base is an existing, active airfield that currently has 125.7 acres of residential lands within the existing 65 dB DNL or greater noise zone, because the increase in noise would be temporary and intermittent, and the aircraft operations generating noise would be consistent with the existing operations at WFF. There are no religious facilities, schools, day care centers, or hospitals within the greater than 65 dB DNL noise zone.

Virginia Coastal Zone Management. WFF Main Base is located within Virginia's coastal zone. Therefore, federal agency development at WFF Main Base that could have reasonably foreseeable effects on Virginia's coastal resources must be consistent with the nine enforceable policies of the Virginia Coastal Zone Management Program. The Navy submitted a Coastal Consistency Determination for the proposed action at WFF Main Base to the VDEQ for concurrence on July 6, 2012. A response from VDEQ was received on September 6, 2012, which concurred that the Navy's proposed action at WFF Main Base is consistent with the Virginia Coastal Zone Management Program, provided all applicable permits and approvals are obtained as described in their letter response (see Appendix A, Agency Consultation).

ES.4.6 Infrastructure and Utilities

Alternative 1: Emporia-Greenville Regional Airport

Alternative 2: Wallops Flight Facility Main Base

At either Emporia-Greenville Regional Airport or WFF Main Base, the new telephone and electric lines associated with the proposed airfield infrastructure improvements to support FCLP would attach into the grid at existing connections and would operate within existing capacity. Therefore, there would be no significant impact on telephone or electrical services. No water or wastewater infrastructure improvements would be necessary at either site to support FCLP.

ES.4.7 Visual Landscape: Light Emissions and Visual Impacts

Alternative 1: Emporia-Greenville Regional Airport

Alternative 2: Wallops Flight Facility Main Base

At either Emporia-Greenville Regional Airport or WFF Main Base, new infrastructure would be installed at the airfield under the proposed action, including painted simulated carrier decks with flush-deck lighting at the ends of each runway approach to be used; small concrete pads for placement of Navy equipment; and new electrical and phone connections for Navy equipment. A new fenced storage area would also be installed at Emporia-Greenville; adequate storage already exists at WFF Main Base. During FCLP training, the existing airport runway lights would be turned off, and only the flush carrier deck box lighting would be used. No increase in off-site lighting would be projected from either airfield. Due to the topography of the sites, little lighting from FCLP operations would be visible beyond either airport. The communities surrounding both Emporia-Greenville and WFF Main Base are generally accustomed to seeing aircraft operating in the area, as both are active airfields.

These airfield-associated modifications and aircraft operations would be consistent with the visual setting for either Emporia-Greenville or WFF Main Base; therefore, there would be no significant impact to the visual landscape under either alternative.

ES.4.8 Geology, Topography, and Soils

Alternative 1: Emporia-Greenville Regional Airport

Alternative 2: Wallops Flight Facility Main Base

Under Alternative 1 and 2, proposed minor construction could expose soils to wind and stormwater erosion, compaction, and rutting. Standard soil erosion and sedimentation controls, best management practices, and appropriate revegetation would be carried out to mitigate the potential impacts. Therefore, there would be no significant impact on geology, topography, or soil resources under either alternative.

ES.4.9 Water Resources**Alternative 1: Emporia-Greenville Regional Airport**

Under Alternative 1, there would be no direct impacts on surface waters from construction. No construction would occur within floodplains or wetlands under Alternative 1; therefore, there would be no direct impacts on these resources. During construction of the concrete pads, surface runoff carrying contaminants or sediment into nearby wetlands and waters would be minimized through the use of proper erosion and sediment control measures, including best management practices (BMPs). Therefore, no indirect impacts to wetlands would occur under Alternative 1.

Alternative 1 would result in the construction of 0.43 acre of new impervious surface along Runway 15/33. The proposed construction would disturb less than 1 acre; therefore, a storm water construction permit and Stormwater Pollution Prevention Plan would not be required. However, an Erosion and Sediment Control Plan would be necessary because the land disturbance would exceed 10,000 square feet (0.23 acre). As a result of its minor construction plus the implementation of erosion control measures, Alternative 1 would have no significant impacts on stormwater.

Alternative 2: Wallops Flight Facility Main Base

Under Alternative 2, there would be no direct impacts on surface waters from construction. No construction would occur within floodplains or wetlands; therefore, there would be no direct impacts on these resources. During construction of the concrete pads, surface runoff carrying contaminants or sediment into nearby wetlands and waters would be minimized through the use of proper erosion and sediment control measures, including BMPs. Therefore, no indirect impacts to wetlands would occur under Alternative 2.

Alternative 2 would result in construction of a maximum of 0.05 acre of new impervious surface along Runways 04/22 or 10/28. The Navy's proposed action and related construction would not significantly contribute to additional stormwater discharge to surface waters. In addition, WFF would not be required to update its Stormwater Pollution Prevention Plan because the proposed construction would disturb less than 1 acre. Also, an Erosion and Sediment Control Plan would not be necessary because the land disturbance would not exceed 10,000 square feet (0.23 acre). Therefore, Alternative 2 would have no significant impacts on stormwater.

ES.4.10 Biological Resources

Construction activities would not result in significant impacts to biological resources. Under both action alternatives, installation of buried utility lines would result in temporary impacts on maintained grassland. Due to the small area impacted, the unlikelihood of maintained grassland supporting many wildlife/bird species, and the temporary nature of the impact, construction would not have a significant impact on wildlife or avian resources under either alternative.

Alternative 1: Emporia-Greenville Regional Airport

Under Alternative 1 at Emporia-Greenville, the increase in noise from aircraft operations could have direct impacts on wildlife; however, scientific literature indicates that intensities and durations of wildlife startle responses decrease with the number and frequency of exposures. Most wildlife in the vicinity of Emporia-Greenville would likely already be or become acclimated to aircraft noise. Therefore, noise associated with aircraft operations would have no significant impact on wildlife for the duration of the Navy's proposed action.

Federally threatened or endangered species were identified as potentially occurring in the vicinity of Emporia-Greenville. However, no suitable habitat for the identified species occurs within the action areas or would be affected by the implementation of Alternative 1. Therefore, there would be no significant impact on, and no effect on, federally listed species under Alternative 1 in either scenario.

An increase in air operations due to the Navy's proposed action could result in a minor increase in the potential of an in-air bird strike at Emporia-Greenville; however, BASH management measures would be implemented, and standard operating procedures would be followed to minimize the strike risk. Given these considerations, there would be no significant impact to birds in flight under Alternative 1.

Alternative 2: Wallops Flight Facility Main Base

Under Alternative 2 at WFF, the increase in noise from aircraft operations could have direct impacts on wildlife; however, scientific literature indicates that intensities and durations of wildlife startle responses decrease with the number and frequency of exposures. Most wildlife in the vicinity of WFF Main Base would likely already be, or would become, acclimated to aircraft noise.

An increase in air operations due to the Navy's proposed action could result in a minor increase in the potential of an in-air bird strike; however, BASH management measures are already in place at WFF, and the base has an active management team along with standard operating procedures to minimize the strike risk. Under Alternative 2, aircraft would fly over the Wallops Island National Wildlife Refuge and a portion of the Barrier Island/Lagoon System Important Bird Area. However, the flights under the proposed action would be temporary and intermittent in nature. It is also expected that most birds/wildlife in these areas are already habituated to the aircraft noise from existing operations at WFF Main Base and rocket launches from Wallops Island. Given these considerations, there would be no significant impact to birds or wildlife from Alternative 2.

Given the current air operations at WFF under baseline/existing conditions, bald eagles nesting near WFF are likely habituated to aircraft activity and noise. Pursuant to the Migratory Bird Treaty Act, 16 U.S.C. 703-712, and the Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668d, there would be no "takes" or significant impacts to the bald eagles occurring near WFF under Alternative 2.

No significant impact to marine mammals, fish, or sea turtles would occur at WFF under Alternative 2. The bottlenose dolphin is the only marine mammal species expected to occur in the waters of Chincoteague Bay adjacent to WFF. Although sea turtles and two federally protected fish species (Atlantic and shortnose sturgeons) have been known to occur in Chincoteague Bay near WFF, sea turtles are not known to nest on the shores near WFF. When compared to baseline/existing conditions at WFF, the change in the projected noise contours under Alternative 2 would be negligible; therefore, it would be unlikely that a bottlenose dolphin, fish, or sea turtle would be in the proposed action impact area during Navy overflights. Moreover, any bottlenose dolphins, fish, or sea turtles occurring regularly in Chincoteague Bay are already habituated to aircraft activity and noise from current and ongoing aircraft overflights, as well as rocket noise from Wallops Island. Therefore, the increase in aircraft operations at WFF Main Base associated with Alternative 2 would not result in Level A or Level B harassment to the bottlenose dolphin, as defined under the Marine Mammal Protection Act, and would be expected to have no effect on sea turtles and sturgeons under the Endangered Species Act, 16 U.S.C. 1531. Likewise, there would be no significant impact to the bottlenose dolphins, fish, or sea turtles.

ES.4.11 Cultural Resources

Alternative 1: Emporia-Greensville Regional Airport

Alternative 2: Wallops Flight Facility Main Base

The Navy consulted with the Virginia State Historic Preservation Office (SHPO) regarding the proposed action at Emporia-Greensville or WFF Main Base, pursuant to Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800. The Navy has completed the Section 106 process for the proposed action at Emporia-Greensville or WFF Main Base. It was determined that the proposed action would have no significant impact on cultural resources.

ES.4.12 Socioeconomics

Alternative 1: Emporia-Greensville Regional Airport

Emporia-Greensville is currently an operating airport facility, and the projected noise resulting from the proposed action would not extend significantly outside the airport property. Results of studies conducted on the effects of aircraft noise on property values have been inconclusive and suggest that numerous factors influence property values. Therefore, the potential increase in noise levels resulting from the proposed action would not be expected to have a significant impact on residential property values around Emporia-Greensville.

The expected increase in the number of operations at Emporia-Greensville slightly increases the potential for an emergency at the airfield. Given the safety record of the E-2/C-2 aircraft, potential incidents requiring the response of emergency services would be expected to be infrequent. Alternative 1 would therefore have no significant impact on community services.

Environmental Justice. Potential minority and/or low-income populations surrounding WFF Main Base were identified in the greater than 65 dB DNL noise zone. U.S. Census data for the census blocks and block groups within the greater than 65 dB noise zone were compared to that of the county. Under Alternative 1, a potential environmental justice community was identified within Census Tract 8801.01, Block Group 3, in Greenville County and Census Tract 2002, Block Group 1, in Southampton County. However, upon further examination at the block-level for Census Tract 8801.01, Block 3039 (where the one house within the greater than 65 dB DNL noise zone is located), the percentage of the population that was minority is below that of Greenville County. In addition, no houses are located within the greater than 65 dB DNL noise zone in Southampton County. Therefore, the potential for disproportionately high and adverse human health and environmental effects would not be considered significant.

Protection of Children from Environmental Health Risks and Safety Risks.

The greater than 65 dB DNL noise zone at Emporia-Greenville under Alternative 1 extends over areas with a higher percentage of people under the age of 21 than that of Greenville County and Southampton County. However, only one house, containing an estimated three people, is located within the greater than 65 dB DNL noise zone in Greenville County, and the noise would be temporary and intermittent. In addition, no houses would be located within the greater than 65 dB DNL noise zone in Southampton County. Therefore, there would not be a disproportionately adverse impact on children, and the proposed action would have no significant impact on the protection of children from health and safety risks.

Alternative 2: Wallops Flight Facility Main Base

WFF Main Base is currently an operating airfield facility, and the projected noise resulting from the proposed action would not be substantially different from existing conditions. Results of studies conducted on the effect of aircraft noise on property values have been inconclusive and suggest that numerous factors influence property values. Therefore, the potential increase in noise levels resulting from the proposed action would not be expected to have a significant impact on residential property values around WFF Main Base.

The expected increase in the number of operations at WFF Main Base slightly increases the potential for an emergency at the airfield. Given the safe track record of the E-2/C-2 aircraft, potential incidents requiring the response of emergency services would be expected to be infrequent. Alternative 2 would therefore have no significant impact on community services.

In a detachment scenario, detachment personnel would be housed in Navy lodging at the installation. Any personnel that could not be accommodated in the Navy lodging on the installation would stay in local hotels/motels. These existing lodging establishments would be able to provide adequate capacity most of the year for the Navy personnel not accommodated in Navy lodging. In a non-detachment scenario, there would be no change in temporary population.

There could be increased calls for community emergency or police response if Navy personnel were to be temporarily housed on WFF Main Base or in the surrounding community during detachment periods. However, this would not be expected to require expenditures on new personnel or equipment because there would be no increase in the permanent local population. Therefore, implementation of Alternative 2 at WFF Main Base would have no significant impact on community services.

Environmental Justice. Potential minority and/or low-income populations surrounding WFF Main Base were identified in the greater than 65 dB DNL noise zone. U.S. Census data for the census blocks and block groups within the greater than 65 dB noise zone were compared to data for Accomack County. Under Alternative 2, Scenario 2, a potential environmental justice community was identified within Census Tract 902, Block Group 3. However, upon further examination at the block level for Census Tract 902, Block 3112, the percentage of the population that was minority is below that of Accomack County. Therefore, the potential for disproportionately high and adverse human health and environmental effects would not be considered significant.

Protection of Children from Environmental Health Risks and Safety Risks. Census Tract 9802, Block Group 1, has a higher percentage of people under the age of 21 than the rest of Accomack County. However, all of the people in this block group appear to be members of the same household, and this residence would not be within the modeled noise zones under any of the scenarios under Alternative 2. Block Groups 2 and 3 in Census Tract 902 have lower percentages of people under the age of 21 than the rest of Accomack County; therefore, there would not be a disproportionately high and adverse effect on children, and the proposed action would have no significant impact on the protection of children from health and safety risks.

ES.4.13 Environmental Management

Alternative 1: Emporia-Greenville Regional Airport

Under the Navy's proposed action, no aircraft or personnel would be permanently stationed or homebased at Emporia-Greenville. Therefore, the Navy would not have a need to store any oil or hazardous materials at the airfield.

Alternative 2: Wallops Flight Facility Main Base

If detachments were to occur, there would be some temporary oil and hazardous materials associated with aircraft maintenance stored at the airfield. However, the Navy would follow established WFF procedures for the management of hazardous materials and hazardous waste. The Navy will also conform to the WFF Pollution Prevention Plan, so there would be no significant impact on pollution prevention at the airfield. The increase in solid waste would be negligible; therefore, there would be no addition of, or significant impact on, the level of solid waste produced.

ES.5 No Action Alternative

Under the No Action Alternative, the Navy would not use the airfield facilities at Emporia-Greenville or WFF Main Base for E-2/C-2 FCLP. E-2/C-2 squadrons, operating from NS Norfolk Chambers Field, would continue to utilize NALF Fentress as the primary local airfield for E-2/C-2 FCLP training requirements supplemented by occasional FCLP training at alternative airfields such as NAS Oceana and by conducting detachments outside the local area when NALF Fentress scheduling reaches maximum capacity. Since the number and type of aircraft operations at Emporia-Greenville or WFF Main Base would not change under the No Action Alternative, there would be no change in the existing environment from the baseline conditions.

ES.6 Cumulative Impacts

Based on a review of past, present, and reasonably foreseeable actions at Emporia-Greenville, WFF Main Base, and their surrounding regions, several actions were considered when analyzing the potential cumulative impacts. Projects at Emporia-Greenville include the ongoing construction of Oak Grove Baptist Church, the ongoing development of the Mid-Atlantic Advanced Manufacturing Center, the reasonably foreseeable runway shift at Emporia-Greenville Regional Airport to bring the airfield into compliance with FAA design standards, and the reasonably foreseeable Parachute/Paraglide and Related Airborne Jump Training. Projects at WFF include the ongoing build-out of Wallops Research Park, the ongoing expansion of NASA's WFF Launch Range, the ongoing NASA WFF alternative energy project (80 acres of solar panels), the ongoing construction of the Olde Mill Pointe residential development, and the reasonably foreseeable NASA Site-wide Programmatic Environmental Impact Statement at WFF. Current operations at both sites would be expected to continue during non-FCLP periods. Based on the analysis in this EA, the proposed action would not have significant cumulative impacts on any resource area when considered with these other actions.

ES.7 Public Notification

The Navy issued a press release on June 17, 2011, announcing the intent to study the potential environmental impacts of conducting E-2/C-2 FCLP operations at Emporia-Greenville. On October 20, 2011, the Navy announced its decision to include WFF Main Base as a potential site for the proposed action.

A 30-day public comment period was scheduled from September 6, 2012, until October 5, 2012. In response to requests from elected officials and members of the public, the Navy extended the public comment period until October 19, 2012. The Navy issued a press release on October 4, 2012, announcing this extension.

The Navy held two open house public information meetings, each from 5:00 p.m. to 8:00 p.m. The first meeting was conducted September 25, 2012, at the Golden Leaf Commons at the Greenville County government complex. The second meeting was conducted September 27, 2012, at the NASA Visitor Center at WFF. Comments were collected during the meetings, via e-mail and through regular mail.

ES.8 Summary of Findings

The proposed action would not result in significant adverse direct, indirect, or cumulative environmental impacts at Emporia-Greenville or WFF Main Base.

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List of Abbreviations and Acronyms

ARFF	Aircraft Rescue and Firefighting
BASH	Bird/Animal Aircraft Strike Hazard
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZ	Clear Zone
dB	Decibel
DNL	Day-Night Average Sound Level
DOD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FCLP	Field Carrier Landing Practice
FRS	Fleet Replacement Squadron
GPS	Global Positioning System
IFLOLS	Improved Fresnel Lens Optical Landing System
LSO	Landing Signal Officer
MOVLAS	Manually Operated Visual Landing Aid System
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration

List of Abbreviations and Acronyms (cont.)

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOLF	Naval Outlying Landing Field
NOTAM	Notice to Airmen
NS	Naval Station
OLF	Outlying Landing Field
PEIS	Programmatic Environmental Impact Statement
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposals
RPZ	Runway Protection Zone
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
UAS	Unmanned Aerial Systems
UNICOM	Universal Communications
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VAC	Virginia Administrative Code
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VOC	Volatile Organic Compound
WFF	Wallops Flight Facility

1

Purpose of and Need for Action

1.1 Introduction

This environmental assessment (EA) evaluates the potential environmental consequences of the U.S. Department of the Navy's (the Navy's) proposed action to conduct regular, scheduled E-2C Hawkeye, E-2D Advanced Hawkeye, and C-2A Greyhound (E-2/C-2) Field Carrier Landing Practice (FCLP) operations at a local airfield that meets the Navy's minimum airfield requirements (described in more detail in Section 1.2.3). For the purposes of this document, local is defined as within 90 nautical miles of Naval Station (NS) Norfolk Chambers Field, in Norfolk, Virginia. The Navy proposes to use the facilities at either Emporia-Greensville Regional Airport (Emporia-Greensville) or at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) until the Navy addresses local FCLP capacity shortfalls on a more permanent basis. The proposed action would support FCLP operations for E-2/C-2 squadrons operating from NS Norfolk Chambers Field, in Norfolk, Virginia. This EA analyzes the environmental consequences associated with both the proposed FCLP operations and minor modifications to airfield facilities to support the FCLP operations.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations on implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), Navy procedures for implementing NEPA (32 CFR 775), and Navy environmental instructions (OPNAVINST 5090.1C CH-1 [U.S. Department of the Navy 2011]). The Navy is the lead agency for the proposed action.

In accordance with 40 CFR 1501.6, the Federal Aviation Administration (FAA) and NASA are serving as cooperating agencies since their specific expertise is needed to ensure adequate evaluation of the potential environmental effects from the Navy's proposed action within each agency's jurisdiction. Furthermore, in accordance with FAA Order 1050.1E, all actions directly undertaken by the FAA or where the FAA has sufficient control and responsibility are subject to NEPA review, including all grants, loans, contracts, leases, construction, research activities, rulemaking and regulatory actions, certifications, licensing, permits, and plans submitted to the FAA by state and local agencies that require FAA approval, and legislation proposed by the FAA (USDOT 2006). A copy of FAA Order 1050.1E is available at the following website:

http://www.faa.gov/documentLibrary/media/order/energy_orders/1050-1E.pdf

The FAA's Environmental Desk Reference for Airport Actions can be found here:

http://www.faa.gov/airports/environmental/environmental_desk_ref/

These two documents were previously included as appendices of the Draft EA but are now incorporated by reference to shorten the length of this document.

Emporia-Greenville is within FAA's National Plan of Integrated Airport Systems. According to the Federal Airport Act of 1946, airports within the National Plan of Integrated Airport Systems receive FAA funding in the form of grants for maintenance and infrastructure improvements. Airport sponsors receiving FAA funding must sign a grant agreement, which obligates the airport sponsors to maintain and operate the airport and resulting airport property in accordance with FAA conditions and standards (per Title 49, United States Code, section 4705(d)). Therefore, any proposed Navy modifications to the Emporia-Greenville property or operations must comply with FAA standards outlined in the most recent master grant agreement executed by the Emporia-Greenville Regional Airport Commission on March 7, 2006. Revenue generated as a result of a lease with the Navy is subject to grant assurance and compliance conditions that require this revenue to stay on the airport and be used for airport-related activity. As WFF is owned and managed by NASA, any proposed modifications to operations or infrastructure at the site must comply with NASA's NEPA procedures outlined in 14 CFR 1216.3.

1.2 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to provide additional local FCLP training capacity for E-2/C-2 squadrons operating from NS Norfolk Chambers Field. Naval Auxiliary Landing Field (NALF) Fentress, the single, local FCLP outlying landing field (OLF) supporting two major naval air installations, Naval Air Station (NAS) Oceana and NS Norfolk Chambers Field, provides the only dedicated local FCLP training environment specifically for meeting both fleet squadron and Fleet Replacement Squadron (FRS) FCLP requirements for three airframes (FA-18, E-2, and C-2). NALF Fentress lacks the capacity to support local E-2/C-2 FCLP training requirements under all operational conditions. As a result, FCLP training is routinely conducted at NALF Fentress during late-night and early morning hours (from 10:00 p.m. to 7:00 a.m.). Having only one OLF to support two major naval air installations can also result in periodic FCLP training capacity shortfalls, necessitating the use of alternative FCLP-equipped airfields, such as Naval Outlying Landing Field (NOLF) Whitehouse, Florida, and NAS Oceana.

1.2.1 Field Carrier Landing Practice Requirements

During FCLP, pilots perform repetitive "touch-and-go" landings at airfields. FCLP is defined as that phase of required flight training that precedes carrier landing operations. It should simulate, as nearly as practicable, the conditions encountered during carrier landing operations (U.S. Department of the Navy

2009a). Pilots of E-2/C-2 aircraft need to be both current and proficient in carrier landing qualification. The skills required to complete carrier landings must be routinely practiced by pilots of all experience levels to maintain the requisite level of proficiency. In order to do that, pilots in both fleet (i.e., carrier air wing) and replacement squadrons (i.e., FRS) conduct FCLP. It is important that lighting, flight patterns, and altitudes flown during FCLP are as close as possible to what a pilot would encounter when landing on an actual aircraft carrier, both during day and nighttime conditions, so that pilots are fully prepared for operations at sea. FCLP operations for fleet E-2/C-2 squadrons and the FRS, operating from NS Norfolk Chambers Field, are primarily conducted at NALF Fentress and through FCLP detachments (i.e., sending a portion of the E-2/C-2 FRS out of the local training area to NAS Jacksonville, Florida). These detachments remove aircraft from availability for other required training events.

Field Carrier Landing Practice at Naval Auxiliary Landing Field Fentress

NALF Fentress is located in the City of Chesapeake, Virginia, approximately 17 miles southwest of NS Norfolk Chambers Field (see Figure 1-1). NALF Fentress is the primary OLF used for FCLP training by all aircraft squadrons (FA-18, E-2, and C-2) stationed at and operating from NS Norfolk Chambers Field and NAS Oceana, located in the City of Virginia Beach, Virginia (see Figure 1-1).

From 2001 to 2010, approximately 75,600 to 96,600 operations were conducted annually at NALF Fentress by all carrier-based aircraft utilizing the airfield, with the most operations occurring in 2007. In 2010, 93,628 operations (of which 93,132 were FCLP operations, which equates to 46,566 FCLP passes) were performed. Additional information on how operations are counted can be found in Section 2.1.1.

NALF Fentress lacks the capacity to support local carrier-based aircraft FCLP requirements under all conditions. NALF Fentress is the single, local OLF for the 16 FA-18 squadrons and FA-18 FRS based at NAS Oceana, Virginia, as well as the five E-2 squadrons, one C-2 squadron, and the E-2/C-2 FRS based at NS Norfolk Chambers Field. No other Navy OLF supports such a demand, and, as a result, several times each year schedule conflicts occur when multiple users (more than one carrier air wing or one or more carrier air wings and the FRS[s]) require use of the OLF at the same time, resulting in FCLP training capacity shortfalls. These capacity shortfalls are exacerbated during summer months when hours of darkness are most limited, as the majority of FCLP training is conducted after sunset. These periodic FCLP capacity shortfalls at NALF Fentress are currently mitigated through the use of alternative FCLP-capable airfields such as NOLF Whitehouse, Florida, and NAS Oceana.

As a result of these periodic FCLP capacity shortfalls, the E-2/C-2 FRS conducts four to six 10-day FCLP detachments to NAS Jacksonville, Florida, annually, completing FCLP training at NOLF Whitehouse. Among other impacts, these detachments remove aircraft from availability for other required flight training during the period of the detachment. As NAS Oceana is a Master Jet Base,

Figure 1-1
Regional Location Map

repetitive training operations, such as FCLP, are not routinely conducted at the airfield as it can interfere with the broader mission of the jet base.

The use of local airfield facilities at either Emporia-Greenville or NASA WFF for E-2/C-2 FCLP will serve as an interim bridge to manage FCLP capacity shortfalls at NALF Fentress until the Navy addresses local FCLP capacity shortfalls on a more permanent basis.

Field Carrier Landing Practice at Naval Air Station Oceana

NAS Oceana occupies 5,776 acres within the limits of the City of Virginia Beach, Virginia, approximately 3.5 miles inland from the Atlantic coast (see Figure 1-1). The station has two sets of dual runways, oriented roughly northeast-southwest (Runways 5R/23L and 5L/23R) and roughly northwest-southeast (Runways 14R/32L and 14L/32R).

The mission of NAS Oceana is to support the Navy's Atlantic and Pacific Fleet Force of strike fighter aircraft and joint/interagency operations. Strike fighter pilots out of NAS Oceana conduct air-to-air and air-to-ground training missions in designated military training ranges along the East Coast. These training requirements are accommodated through departures and arrivals at NAS Oceana. NAS Oceana is not used routinely for FCLP training because of scheduling conflicts with training evolutions conducted by both FA-18 fleet squadrons and the FA-18 FRS. NAS Oceana operations are also constrained by pattern, altitude, and flight path restrictions.

When FCLP training is conducted at NAS Oceana, the normal departures and arrivals at the air station can be disrupted. The parallel runway design at NAS Oceana is intended to accommodate high-tempo operations by allowing arrivals on one runway while simultaneous departures occur on the other. Conducting FCLP operations on one runway effectively closes that runway for any other use. Any squadron conducting FCLP operations at NAS Oceana leaves only one runway to support all other flight and training operations.

Field Carrier Landing Practice at Naval Station Norfolk Chambers Field

Chambers Field is the airfield located onboard NS Norfolk. NS Norfolk is located in the southeastern corner of the Commonwealth of Virginia, in the Sewells Point area of the City of Norfolk, and is the largest naval complex in the world (see Figure 1-1). NS Norfolk has two primary components: 1) the pier facilities that berth ships, to include aircraft carriers and submarines, and 2) the airfield known as Chambers Field. The mission of NS Norfolk Chambers Field is to support the operational readiness of the U.S. Atlantic Fleet, primarily by providing facilities and services to support the missions of its tenant commands. Aircraft utilizing NS Norfolk Chambers Field include fixed-wing aircraft and rotary-wing aircraft (see Section 3.2.1.1.1 for a definition of “fixed-wing” and “rotary-wing”). Fixed-wing aircraft types, in addition to the E-2/C-2 squadrons discussed in Section 1.2.2, include the C-9, C-130, C-5, FA-18C/D Hornet, and FA-18E/F Super Hornet. Rotary-wing aircraft types that are currently utilizing, or are projected to utilize, NS Norfolk Chambers Field include the MH-60S, SH-60F/HH-60H, MH-53, and

CH-46E. NS Norfolk also has numerous major non-Navy tenants, such as the United States Air Force Air Mobility Command Passenger and Air Cargo Terminal. Located on the south side of the airfield, the terminal supports the movement of approximately 10,000 passengers and 1,500 to 2,500 tons of cargo per month in support of military missions worldwide (U.S. Department of the Navy 2009b).

The basic flight operations at NS Norfolk Chambers Field are departures, straight in/full-stop arrivals, overhead arrivals, touch-and-go operations, low approaches, low-work/hover areas, and ground control approaches. The 2009 NS Norfolk Chambers Field Air Installations Compatible Use Zones report projects approximately 43,845 fixed-wing and 96,466 helicopter operations, for a total of 140,311 annual operations. The total operational count includes transient aircraft that utilize NS Norfolk Chambers Field but are not permanently based at the installation (U.S. Department of the Navy 2009b).

FCLP is not conducted at Chambers Field for a number of operational reasons. Chambers Field has only a single east-west runway (Runway 10/28) that supports flight operations for all aircraft operating from the airfield. Conducting FCLP operations at Chambers Field would effectively close this single runway to all other flight operations or would result in numerous interruptions to FCLP training as these aircraft would need to give way to inbound and outbound traffic. Additionally, the landing pattern altitude and direction do not support the regular FCLP pattern.

Outlying Landing Field Environmental Impact Statement

In recognition of the scheduling capacity shortfalls of NALF Fentress, the Navy was studying the potential environmental impacts and feasibility of constructing an additional OLF. The additional OLF would have supported FCLP training for carrier-based fixed-wing squadrons stationed at and operating from NAS Oceana (FA-18C Hornet and FA-18E/F Super Hornet squadrons and FRS) and NS Norfolk Chambers Field (E-2/C-2 squadrons and FRS). Under this effort five site alternatives were identified as potential OLF locations. The Navy began preparing an Environmental Impact Statement (EIS) to analyze the potential environmental impacts of construction and operation of the additional OLF. However, in January 2011, the Navy suspended release of and stopped work on the OLF Draft EIS until the Joint Strike Fighter basing and training requirements for the East Coast are better defined. Currently, the Navy is developing an EIS analyzing the potential environmental impacts of West Coast Joint Strike Fighter homebasing options. An EIS to evaluate Joint Strike Fighter homebasing on the East Coast will commence at a date to be determined, but no earlier than 2014. At that time, the Navy will re-evaluate the local OLF requirement and potential East Coast Joint Strike Fighter homebasing locations.

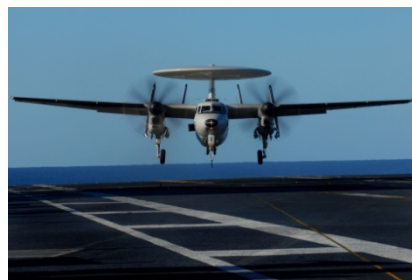
1.2.2 Naval Station Norfolk Chambers Field E-2/C-2 Squadrons

Currently, six fixed-wing carrier air wing squadrons (five E-2C Hawkeye squadrons and one C-2A Greyhound squadron) and the Navy's single E-2/C-2 FRS operate from NS Norfolk Chambers Field.

These six carrier air wing E-2/C-2 squadrons, or “fleet” squadrons, are assigned to the Atlantic Fleet and deploy aboard aircraft carriers as part of the larger attached carrier air wing. The FRS trains naval aviators and naval flight officers on the specific aircraft (E-2 or C-2) they have been assigned to fly. The FRS does not deploy. Students in the FRS are graduate-level aviators, aviators transitioning from one type aircraft to another, or aviators returning to the cockpit after assigned duty away from flying. After completing the required training syllabus, to include FCLP training, FRS graduates are then assigned to a fleet squadron. The amount of FCLP training required for FRS pilots prior to carrier qualifications varies, but it is generally higher than that of fleet pilots.

E-2C/D Hawkeye/Advanced Hawkeye

The E-2C/D aircraft is the Navy’s twin-engine, turboprop, all-weather, carrier-based, airborne early warning and control platform. It provides early warning and command and control functions for the carrier strike group to which it is attached. Additional missions include surface surveillance coordination, strike and interceptor control, search and rescue guidance, and communications relay.



The E-2C Hawkeye is gradually being replaced by the E-2D Advanced Hawkeye. The E-2D Advanced Hawkeye entered operational service in 2010 and began replacing the E-2C in 2011. E-2Cs will be fully replaced by E-2Ds by 2022. The differences between the E-2C and E-2D do not extend to the engine and propellers that drive the aircraft; therefore, the E-2C and E-2D are the same with respect to environmental considerations (specifically, noise). Currently, 28 E-2C and one E-2D aircraft are stationed at NS Norfolk Chambers Field, which includes 20 E-2C aircraft assigned to the fleet squadrons and eight E-2C and one E-2D aircraft assigned to the E-2/C-2 FRS. The Navy’s only E-2/C-2 FRS is stationed at NS Norfolk Chambers Field.

C-2A Greyhound

The C-2A Greyhound is a twin-engine, turboprop cargo plane designed to land on aircraft carriers. The aircraft is capable of carrying 10,000 pounds of cargo and up to 26 passengers. Currently, 17 C-2A Greyhound aircraft are stationed at NS Norfolk Chambers Field, which includes 12 C-2A aircraft assigned to the single East Coast Fleet Logistics Support Squadron and five C-2A aircraft assigned to the E-2/C-2 FRS.



1.2.3 Airfield Requirements

In February 2011, the Navy began the search for an airfield beyond the Department of Defense’s (DOD’s) currently available Hampton Roads airfields for E-2/C-2 FCLP operations. The Navy prepared a detailed list of Navy FCLP

requirements, including the required airfield specifications, planned infrastructure modifications, support services, airspace, flight tracks, operational availability, and security. The list includes, among other items, the following specific airfield requirements:

- (1) The airfield used must be within a maximum aircraft transit distance of 90 nautical miles from NS Norfolk Chambers Field. This transit distance represents the maximum distance an E-2/C-2 aircraft can transit to an airfield, conduct a three-hour FCLP training period, and return to homebase with required fuel reserve under Visual Flight Rules without refueling;
- (2) The minimum runway length must be equal to, or greater than, 5,000 feet (rounded to the nearest 100 feet), which represents the minimum runway length for an E-2/C-2 to complete a takeoff or full-stop landing under normal procedures; and
- (3) The minimum runway width must be equal to, or greater than, 100 feet.

Infrastructure Modification Requirements

In order to support E-2/C-2 FCLP operations, the following infrastructure modifications and equipment need to be installed at any prospective FCLP airfield:

- (1) **Simulated Carrier Decks.** A painted, day/night simulated carrier deck with flush-deck lighting must be installed on each end of the runway designated for nighttime E-2/C-2 FCLP operations. Each simulated carrier deck must have centerline, edge, and—for those designated for nighttime use—threshold lights. A painted carrier deck, without lighting, must be installed on each end of the runway designated for daytime-only E-2/C-2 FCLP operations. The Landing Signal Officer (LSO) stationed at the runway must have the ability to turn the lighting on and off on demand.
- (2) **Concrete Pads.** Concrete pads must be installed alongside each simulated carrier deck for the placement of the following Navy equipment:
 - a) Improved Fresnel Lens Optical Landing System (IFLOLS);
 - b) Manually Operated Visual Landing Aid System (MOVLAS); and
 - c) LSO workstation.
- (3) **Storage Area.** A fenced and secure storage area located outside the Runway Safety Area and Runway Object Free Area positioned so as not to penetrate Federal Aviation Regulation (FAR) Part 77 airspace criteria, and sufficient to store the equipment listed above when not in use by the Navy, is required per FAA regulations. The storage area requirement applies to Emporia-Greenville only.
- (4) **Electrical Power.** Sufficient electricity must be available, or power lines must be installed, to power the simulated carrier decks' lighting and the equipment listed above. Electricity must also be available or installed to power the following equipment inside or near the LSO workstation:

- a) one ultra high frequency and one very high frequency radio;
- b) one telephone land line;
- c) overhead and desk lighting; and
- d) abeam position marker.

Support Services Requirements

In addition to the infrastructure modifications identified above, various services will be required to support E-2/C-2 FCLP operations. Services required to support the proposed action include fire and rescue, debris and snow removal, and relocation of Navy equipment, among others.

1.2.4 Description of Emporia-Greensville Regional Airport and Wallops Flight Facility

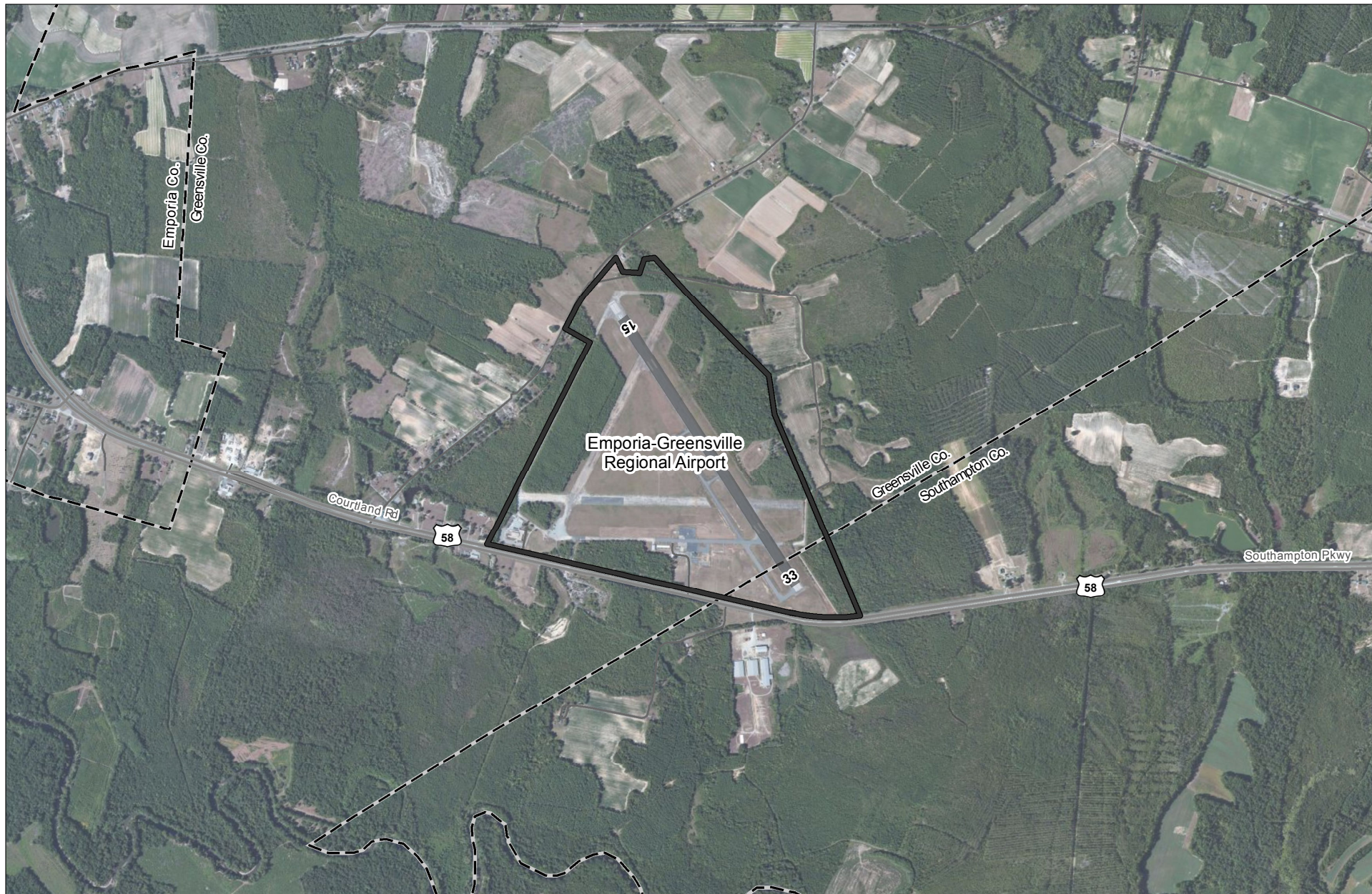
Emporia-Greensville meets the minimum airfield specification requirements for E-2/C-2 FCLP and is being examined as an alternative in this EA. Emporia-Greensville is 65 nautical miles from NS Norfolk Chambers Field (see Figure 1-2). The single runway at Emporia-Greensville, identified as 15/33, is 5,010 feet long and 100 feet wide. The runway is aligned with prevailing winds, has existing edge lights, and is in good condition.

Emporia-Greensville is primarily located within Greensville County, with the southeastern end of the runway located in Southampton County. The entrance to Emporia-Greensville is 1.4 miles east of the city limits of the City of Emporia, Virginia (see Figure 1-2). Approximately 2,320 general aviation aircraft operations occur annually and a total of four privately owned aircraft are based at the airport.

Emporia-Greensville is publically owned and is managed by an airport commission. An executive director manages the airport's finances and operations and reports to the airport commission. The airport commission contracts with a private company to operate the airport and provide aeronautical services such as fueling, hangaring, tie-down, and parking, as needed. Equal portions of the airport's operating and capital improvement funds come from the City of Emporia and Greensville County. The airport also receives funding from the FAA, the Virginia Department of Aviation, and on-site aviation gasoline sales.

In addition to airport operations, a trucking school associated with Southside Virginia Community College uses the airport property. A fire training facility is located adjacent to but off airport property, just east of the runway; access to the facility is provided through airport property. The airport terminal is open daily from 9:00 a.m. to 5:00 p.m.

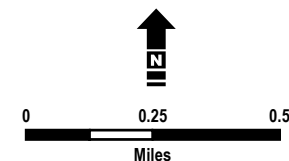
WFF meets the minimum requirements to support Navy E-2/C-2 FCLP (see Section 1.2.3) and is also being considered in this EA. Wallops is a federally-owned facility that was established by NASA's predecessor, the National Advisory Committee for Aeronautics, in 1945. Wallops was originally built to conduct aeronautical research using rocket-propelled vehicles and launched its first rocket on July 4, 1945. Today, WFF is NASA's principal facility for suborbital research program management and implementation. NASA seeks to



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

Figure 1-2
Emporia-Greenville Regional Airport

- Active Runway
- Major Highway
- Emporia-Greenville Regional Airport
- Local Street
- County Boundary



enable education and build innovative partnerships at WFF, including provision of flight projects and technology development for the DOD and other government agencies through high-quality, low-cost, and responsive capabilities.

Located in Accomack County, WFF is approximately 70 nautical miles from NS Norfolk. It consists of three parcels: Main Base, Mainland, and the Wallops Island launch site (see Figure 1-3). The airfield is located on the Main Base (for the purposes of this EA, WFF Main Base will be used when referring specifically to this property), which is located on the Eastern Shore of Virginia, 5 miles west of Chincoteague, Virginia. WFF Main Base airfield has three runways, two of which meet the Navy's length requirement discussed in Section 1.2.3 and could support Navy E-2/C-2 FCLP operations. Runway 04/22 is 8,750 feet by 150 feet, and Runway 10/28 is 8,000 feet by 200 feet. Runway 17/35, at 4,820 feet, does not meet the Navy's length requirement (5,000 feet) and is not being examined for potential Navy use in this EA (see Figure 1-4). Navy facilities at WFF Main Base are limited to administrative buildings and barracks (NASA 2008a).

The Navy's Surface Combat Systems Center provides facilities that replicate Navy fleet ships for purposes of training and technology validation. The Naval Air Warfare Center Aircraft Division, from Patuxent River, Maryland, also maintains facilities and personnel at WFF and regularly utilizes the range for missile launches and aircraft development testing (NASA 2008a). The Mainland and the Wallops Island launch site are approximately 7 miles southeast of the Main Base.

WFF has a staff of over 1,000 civil servants and contractors. The facility currently operates Monday through Friday, 6:00 a.m. to 6:00 p.m., excluding federal holidays (NASA 2008a, 2010b, 2010c).

1.3 Scope of the Environmental Assessment

This EA provides an assessment of the potential impact on the natural, physical, and human environment from the proposed Navy E-2/C-2 FCLP operations and associated minor modifications to airfield facilities at Emporia-Greenville or WFF Main Base. Because proposed construction activities described in this EA would be minor, the primary areas of potential impact include resources associated with aircraft operations, i.e., airspace, noise, air quality, and land use.

This EA identifies reasonable alternatives for the action and evaluates direct and indirect impacts that may result from each alternative. Potential impacts are compared to the No Action Alternative, which is the current condition. The No Action Alternative is used as a benchmark for decision makers to compare the potential environmental effects of the proposed action and alternatives with existing baseline conditions. Where the potential for adverse impacts related to any of the alternatives described in this EA exists, measures to minimize or mitigate them and an evaluation of the impacts of these measures are provided. This EA also addresses cumulative impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.



Source: ESRI, 2010

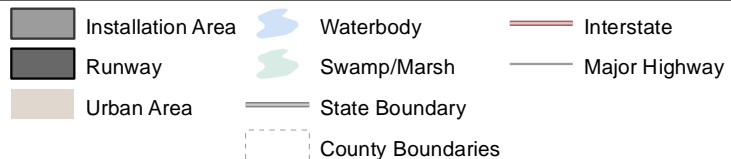
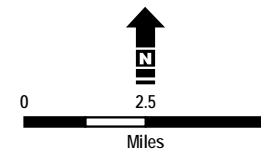


Figure 1-3
Wallops Flight Facility
Regional Overview

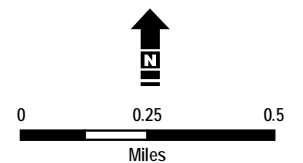




Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

Figure 1-4
Wallops Flight Facility

- Active Runway
- Wallops Flight Facility
- Major Highway
- Local Street
- County Boundary



The environmental resources potentially affected by the proposed action and evaluated in this EA are:

- Aircraft operations and airspace
- Safety
- Air quality
- Noise
- Land use
- Infrastructure and utilities
- Visual landscape: light emissions and visual impacts
- Geology, topography, and soils
- Water resources
- Biological resources (including threatened and endangered species)
- Cultural resources
- Socioeconomics
- Environmental management

Information documented in this EA has been derived from meetings with local, state, and federal agency representatives and from review of the documents and contact reports listed in the reference section (Section 6) of this report (see Appendix A, Agency Consultation). Study areas are defined by resource in Section 3.

1.4 Public Notification and Outreach

The Navy issued a press release on June 17, 2011, announcing the intent to study the potential environmental impacts of conducting E-2/C-2 FCLP operations at Emporia-Greensville. On October 20, 2011, the Navy announced its decision to also include WFF Main Base as a potential site for the proposed action.

The Navy released the Draft EA for public review and comment on September 6, 2012. The Draft EA public comment period began with the Public Notice that was published in *The Virginian Pilot*, *The Richmond Times Dispatch*, *Eastern Shore News*, *Independent Messenger*, *Chincoteague Beacon*, *Eastern Shore Post*, and *The Daily Times* (Maryland), indicating the availability and locations where the Draft EA could be reviewed. Additionally, the Draft EA was made available on the following NAVFAC MIDLANT Web site:

https://portal.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_navfacmidlant_pp/midlant_ps/environmental_norfolk/tab3987837

A press release was also distributed to media outlets serving the area surrounding the Emporia-Greensville Regional Airport and WFF Main Base, as well as Hampton Roads, Virginia. Public Notice letters were also sent directly to federal and state agencies and to the Emporia-Greensville Airport Commission and NASA Wallops staff (see Appendix A, Agency Consultation).

One hard copy and one electronic copy of the Draft EA were placed in the following public locations for review:

- Emporia-Greenville Regional Airport
139 Airport Drive
Emporia, VA 23847
- Richardson Memorial Library
100 Spring Street
Emporia, VA 23847
- Chincoteague Island Library
4077 Main Street
Chincoteague Island, VA 23336
- Eastern Shore Public Library
23610 Front Street
P.O. Box 360
Accomack, VA 23301

A 30-day public comment period was scheduled from September 6, 2012, until October 5, 2012. In response to requests from elected officials and members of the public, the Navy extended the public comment period until October 19, 2012. The Navy issued a press release on October 4, 2012, announcing this extension.

The Navy held two open house public information meetings, each from 5:00 p.m. to 8:00 p.m. The first meeting was conducted September 25, 2012, at the Golden Leaf Commons at the Greenville County government complex at 1300 Greenville County Circle, Emporia, Virginia. The second meeting was conducted September 27, 2012, at the NASA Visitor Center at WFF. Comments were collected during the meetings, via e-mail, and through regular mail. Copies of posters and handouts provided during the public meetings can be found in Appendix D, Public Meeting Materials.

1.4.1 Public Comments

A total of 597 comments were received during the public review period, of which 124 dealt with Emporia-Greenville and 468 with WFF. Of the 468 comments related specifically to WFF Main Base, 419 were form letters from Chincoteague Bay Trails End Association, Inc., property owners, expressing concerns about noise, safety, biological resources, socioeconomics, and other personal issues. When individual comments were added to the form letters, those comments were read and considered in our responses.

The Navy received comments both in support of and in opposition to the proposed action. Several comments expressed a preference for one site or the other or for use of Runway 10/28 over Runway 04/22 at WFF to avoid impacts to the Trails End and Captain's Cove communities. The comments expressing support for the proposed project noted that there may be long-term economic benefits for the community chosen; that the proposed project would be a good use of existing

federal resources; that the E-2/C-2 are quiet aircraft; and that Navy pilots need the training to protect our country.

Primary public concerns about the Navy's proposed project are addressed in the following paragraphs. The changes made to the EA in response to public and agency comments are summarized in Section 1.4.2. State and federal agency comments received in response to the Draft EA can be found in Appendix A, Agency Consultation.

1.4.1.1 Flight Patterns/Operations

Comment Summary. Some comments expressed concern about the locations of proposed FCLP and holding pattern flight tracks (Figures 2-4 through 2-8) and about the increase in air traffic—especially at night—over the areas surrounding Emporia-Greenville or WFF. Others commented that the Navy's proposed operations could impact current airport operations at and around Emporia-Greenville or WFF.

Response. To provide the most beneficial training, environmental conditions must be as similar as possible to the conditions that Navy pilots will encounter at sea. During FCLP training, pilots need to fly in the same pattern they use to land on an aircraft carrier (see Section 2.1.1 for a discussion of the Navy's proposed operations). FCLP operations are conducted at airfields on land to provide pilots the opportunity to simulate carrier-landing operations in an environment where the risks associated with carrier operations at sea can be safely managed. The racetrack FCLP pattern is flown at an altitude of 600 feet to replicate the pattern at the ship. Because a major portion of at-sea operations are conducted at night, FCLP training must also include nighttime training.

To address the comments stating concerns over the locations and impacts of the proposed holding patterns, the Navy made two operational adjustments and re-analyzed the associated impacts:

- (1) Holding pattern altitude was elevated to at or above 3,500 feet above ground level instead of 2,000 feet.
- (2) The two holding pattern locations for both alternatives were reduced to only one pattern location, as depicted in Figures 2-5 and 2-8.

These adjustments would reduce potential aircraft noise associated with the Navy's proposed action and minimize noise over more populated areas.

Airport closure periods caused by Navy FCLP will be communicated to local airfields and aviators in advance through the use of a notice to airmen (NOTAM). The airfield universal communications (UNICOM) frequency will also be monitored continuously during FCLP operations. Proper communication will help ensure the pilots conducting FCLP operations will respond appropriately and safely to requests from emergency aircraft. Advanced scheduling will preclude most conflicts with local aviation operations.

1.4.1.2 Noise

A number of the public comments received were related to noise expected from the E-2/C-2 FCLP operations. Noise comments and responses are discussed under individual subtopics below. To address the comments regarding potential noise impacts, the Navy made two operational adjustments to the holding patterns discussed in Section 1.4.1.1 and re-analyzed the associated impacts. The Noise Analysis (see Appendix B) and noise contours depicted in Figures 3-10, 3-11, 3-14, and 3-15 have been updated accordingly. During the incorporation of the revised noise contours, additional Trails End Campground properties within the greater than 65 decibel (dB) Day-Night Average Sound Level (DNL) noise zones that were not included in the September 2012 Draft EA were identified in Tables 3-21 and 3-22. As a result, the Final EA includes revised estimates of the number of properties and residences within the greater than 65 dB DNL noise zones for Alternative 2, Scenarios 1 and 2, at WFF Main Base. In the Final EA, Section 3.5.4.2.1 – Alternative 2, Scenario 1, and Section 3.5.4.2.2 – Alternative 2, Scenario 2, have been revised to present an update of the estimated properties and residences within the greater than 65 dB DNL noise zones. The revision to the estimated number of properties and residences and estimated population did not change the overall impact analysis or conclusion as the analysis included those residences.

1.4.1.2.1 Noise Study and Conclusions

Comment Summary. Requests were made to include analysis on noise contours less than the 65 dB DNL to more accurately represent the total number of people impacted by noise. Another request was that the Navy consider one-time noise events based on field measurements instead of the current modeling that averages noise impacts. Some statements disagreed with the Navy's conclusion that an increase in operations at either Emporia-Greenville or WFF would not result in a significant noise impact to residents and/or businesses. Concerns were expressed about potential noise impacts to those people living in mobile homes and structural damage to other dwellings from noise.

Response. A comprehensive noise study was conducted by the Navy in accordance with the latest guidance and using the best available information and scientific methods (see Appendix B, Noise Analysis). The methodology used by the Navy to analyze noise impacts to the community, DNL, is the FAA-approved process for analyzing aircraft noise for commercial airports, and it is the metric used by all federal agencies for predicting human annoyance and other potential noise effects on humans. DNL takes into account the noise levels of all individual events that occur during a 24-hour period, the number of events, and the times of those events. Alternative methodologies for completing an aircraft noise study would not meet accepted standards.

The threshold for structural-damage from noise starts at 130 dB (National Research Council 1977). The noise that would be generated from E-2/C-2 FCLP

operations at Emporia-Greenville or WFF Main Base under any proposed scenario, does not reach 130 dB.

As a cooperating agency in evaluation of Alternative 1, the FAA has reviewed the Navy's conclusion of no significant impact for noise at Emporia-Greenville.

For a more complete discussion of the potential noise impacts for each specific airfield, see Section 3.5.

1.4.1.2.2 Night Training

Comment Summary. Statements were made that late-night flights, proposed to occur between 10:00 p.m. and 7:00 a.m., could impact sleep and quality of life.

Response. Approximately half of the proposed Navy E-2/C-2 training at either Emporia-Greenville or WFF Main Base would be conducted during daylight hours and half during hours of darkness. For purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours and would end as soon as possible. Because sunset occurs later during the long daylight hours of the summer months, FCLP training that begins after sunset may continue as late as 1:00 a.m., or later.

As described in Section 3.5, acoustic night is a noise analysis term. Operations during acoustic night (defined as between the hours of 10:00 p.m. and 7:00 a.m.) are "penalized" by adding 10 dB to account for the lower background sound levels and greater community sensitivity to noise during late-night or early morning hours. In order to minimize noise impacts to the community to the greatest extent feasible, the Navy attempts to end flight operations before 10:00 p.m. whenever possible.

1.4.1.2.3 Health Effects

Comment Summary. Concerns included potential impacts to public health, including hearing loss and other impacts to the following groups: elderly, children (both in general and while in school), veterans, the disabled, low-income, and those suffering from chronic illnesses.

Response. Both airports under analysis are existing, operating airfields. While the Navy's proposed action would increase operations at either airport, those people residing, working, or otherwise near either airport on a regular basis are already experiencing some level of noise. Aviation and typical community noise levels near airports are not comparable to the occupational or recreational noise exposures associated with hearing loss (Wyle 2012). Studies of aircraft noise levels associated with civilian airport activity have not definitively correlated permanent hearing impairment with aircraft activity (Newman and Beattie 1985, Eldred and von Gierke 1993). A 2009 DOD policy directive requires that hearing loss risk be estimated for military installations for the at-risk population, defined as the population exposed to 80 dB DNL or greater (DOD 2009). DNL is the science-based FAA- and DOD-accepted metric for assessing potential long-term

hearing loss. The sound level that would be generated at either Emporia-Greenville or WFF Main Base would not be expected to reach 80 dB DNL, even within the airport property. As a result, there would be little to no risk for potential loss of hearing associated with the proposed FCLP operations. Likewise, there is no scientific basis for a claim that other, nonauditory health effects exist for aircraft sound levels below 75 dB DNL (DOD 2009). Despite some Sound Exposure Level (SEL) values being higher than 80 dB, these represent isolated, single-event noise events and not the day-night average that is represented by the DNL noise contours. For additional discussion on the noise metrics used to describe the sound environment and to quantitatively measure the effect of noise on the environment, see Section 3.5.

In analyzing the areas surrounding both airfields, the Navy adjusted the locations of the landing carrier box areas on the runway as well as the locations and altitudes of the holding area in an effort to address noise concerns. The carrier box locations were chosen to ensure that pilots would not fly the FCLP pattern over schools, hospitals, or nursing homes at low levels. The proposed action would also not be expected to have disproportionate high or adverse human health or environmental effects on vulnerable populations, such as the elderly, children, or those with low incomes. See Section 3.13 for more information on existing socioeconomic conditions and potential impacts.

1.4.1.2.4 Animals

Comment Summary. Statements were made that pets, livestock, and wildlife could be negatively impacted by the noise associated with the proposed action.

Response. A majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals, in particular, appear to react to noise at sound levels higher than 90 dB, with responses including startle, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Multiple studies on domestic animals suggest that many species appear to acclimate to some forms of sound disturbance (Manci et al. 1988).

Section 3.11 evaluates the impacts of the proposed FCLP operations on biological resources, including the effects on wildlife such as birds and threatened and endangered species. Sections 3.11.2 and 3.11.4 describe the potential impacts of construction and noise on wildlife at the alternative locations being analyzed. Several scientific studies (Grubb and King 1991; Ellis et al. 1991; Black et al. 1984; Conomy et al. 1998) indicate that wildlife acclimate to noise. Since most species surrounding the two airfields being analyzed are already experiencing noise associated with the current aircraft operations, it is anticipated that the noise associated with the proposed action would not significantly impact wildlife. Species not already acclimated to the noise would be anticipated to habituate to any additional noise over time.

1.4.1.2.5 Land Use

Comment Summary. A few comments pertained to analysis in the land use section of the EA. One in particular questioned the FAR Part 150 Noise Compatibility designations used in the document as a guide for existing compatible and incompatible land uses.

Response. The 24-hour DNL is a reliable measure of community sensitivity to aircraft noise and is the FAA and DOD standard noise metric used in the United States to measure the effects of aircraft noise for both commercial airports and military installations. Community reactions to noise and land use planning recommendations generally begin at the 65 dB DNL noise contour. All land uses are considered to be compatible with noise less than 65 dB DNL, and the Navy makes land use recommendations for compatible development of 65 dB DNL and above noise zones. Residential land uses are normally considered compatible with noise at or below 65 dB DNL. Section 3.6.2.1 describes the land uses that could be impacted under the Emporia-Greenville alternative, and Section 3.6.4.1 describes the land uses that could be impacted under the WFF Main Base alternative.

1.4.1.2.6 Mitigation

Comment Summary. Suggestions included that the Navy take appropriate measures to mitigate noise and recommended the following measures: reduce the number of nighttime flights, reduce the frequency of flights, and/or compensate homeowners for noise impacts by purchasing their property.

Response. The Navy remains dedicated to working with the community to minimize impacts from the proposed FCLP training. For operations at Emporia-Greenville, the Navy has coordinated with the airport commission and FAA in an attempt to mitigate any potentially significant noise concerns. The locations of the landing carrier box areas on the runway as well as the location and altitude of the holding area have been adjusted in an effort to address noise concerns.

1.4.1.3 Safety

Comment Summary. Comments included concern about aircraft safety and the safety of the residents and businesses in the community. Comments were related to runway length, the ability of pilots to land aircraft in an emergency, and concern about whether there are accident potential zone designations at both Emporia-Greenville and WFF Main Base. Concerns were expressed about the possibility of increased bird/animal aircraft strikes, especially at dusk. Some also stated that WFF Main Base would be a safer choice than Emporia-Greenville because necessary emergency equipment and response procedures are already available.

Response. The Navy places an extremely high priority on safety. For a more detailed discussion of existing safety procedures and potential impacts to safety under the proposed action, see Section 3.3.

The minimum runway length required for the proposed action is 5,000 feet. The runways under analysis at both alternative locations in the EA meet the requirements in the Request for Proposals (RFP).

As Emporia-Greenville is within the FAA's National Plan of Integrated Airport Systems, the FAA has established runway protection zones (RPZs) at each end of Runway 15/33 to enhance the protection of people and property on the ground by limiting development and/or activities that would result in concentrations of people in areas where accidents, if they were to occur, would be more likely to occur. WFF has established clear zones (CZs), similar to civilian airfield RPZs, and potential accident zones for Runways 04/22 and 10/28 in the same manner. Under the Navy's proposed action, there would be no changes to RPZs, CZs, or potential accident zones at either Emporia-Greenville or WFF Main Base.

Bird/Animal Aircraft Strike Hazard (BASH) is a concern for both civilian and military aviation. To reduce the potential for BASH, plans are developed for individual airfields to mitigate the BASH risk. Both locations will have active BASH-management techniques to mitigate BASH risks. See Section 3.3 for a more detailed discussion.

Both alternative locations analyzed in the EA have local emergency response services in place to respond to an emergency, if one were to occur. Emporia-Greenville relies on two local volunteer fire departments, while WFF has a 24-hour fire department servicing WFF Main Base and WFF Wallops Island. NASA also has a mutual aid agreement with the Accomack-Northampton Fireman's Association. See Section 3.13 for a more detailed discussion of existing community services, including fire and rescue.

Based on Navy Aircraft Firefighting and Rescue requirements, naval facilities must provide a standard level of firefighting capacity, including total number of firefighting vehicles and a specific gallon amount of water, at a required flow rate, based on the takeoff gross weight of the largest aircraft operating at that airport (NAVAIR 2012). These are naval airfield requirements, not aircraft requirements, so aircrew piloting E-2/C-2 aircraft away from home base can use public airfields that may not have these same capabilities. The FAA has similar standards, identified as Aircraft Rescue and Firefighting (ARFF); however, Emporia-Greenville is not required to hold a certification under the FAA's ARFF (14 CFR Part 139). As discussed in Section 3.13, the airport would be serviced by local fire departments if a mishap were to occur. The Navy would negotiate any additional fire and rescue needs as part of a service agreement with the chosen airport.

1.4.1.4 Wildlife

Comment Summary. In addition to concerns about wildlife addressed in the Noise (Section 1.4.1.2) and Safety (Section 1.4.1.3) sections, some comments expressed concern that removal of natural habitat would lead to deaths of wildlife, while others wondered about impacts to endangered species and local wildlife refuges at WFF.

Response. The Navy continues to coordinate with regulatory agencies as well as with cooperating agencies to minimize impacts to wildlife and ensure compliance with existing regulatory requirements, including the Endangered Species Act (ESA). No threatened or endangered species would be expected to be impacted as a result of the Navy's proposed action at either alternative under consideration. Likewise, no wildlife habitat off of existing airport property at either location would be disturbed by the infrastructure improvements proposed to facilitate FCLP. The areas on airport property that could be disturbed by proposed infrastructure improvements are maintained grassland habitat and would be unlikely to support many species of wildlife or birds.

Under Alternative 2, aircraft would fly over the Wallops Island National Wildlife Refuge and a small portion of the Barrier Island/Lagoon System Important Bird Area. Other sources of human-made noise occur at WFF (e.g., rocket launches from Wallops Island, located approximately 6 miles from the southern boundary of WFF Main Base). Given the current air operations at WFF Main Base (13,074 annually) and the likelihood that birds and other wildlife near the facility are already habituated to aircraft noise, no significant impacts to the National Wildlife Refuge or Important Bird Area would be expected from an increase in air operations (see Section 3.11 for a discussion of Biological Resources).

1.4.1.5 Socioeconomics

Comment Summary. The public submitted the following concerns pertaining to aspects of social and economic issues:

- FCLP training at Emporia-Greenville or WFF could result in declining property values due to increased noise;
- Potential for the proposed action to impact tourism and/or outdoor recreation such as fishing and hunting;
- Potential negative impacts to local businesses and farms, including convenience stores, rental properties, and crop production;
- Impacts to cell phone and television reception;
- The EA should contain more information on the demographics of those impacted in the Trails End community north of WFF;

- More information is needed on the economic benefits of the proposed action; and
- Additional construction would be required for potential detachments, which could occur to WFF four to six times per year.

Response. A comprehensive noise study was conducted as part of this EA. The study concluded that the projected noise resulting from the proposed action would not extend far outside of the Emporia-Greenville property and that the projected noise resulting from the proposed action at WFF Main Base would not be substantially different from existing conditions. Since the noise impacts would not be expected to be significant, no corresponding impacts to property values, tourism, recreation, or other socioeconomic resources would be expected as a result of implementing the proposed action.

Real property values are dynamic and influenced by a combination of factors, including market conditions, neighborhood characteristics, and individual real property characteristics (e.g., the age of the property, its size, and its amenities). The degree to which a particular factor may affect property values is influenced by many other factors that fluctuate widely with time and market conditions. Results of studies conducted on the effects of aircraft noise on property values have been inconclusive and suggest that numerous factors influence property values. Therefore, the potential increase in noise levels resulting from the proposed action would not be expected to have a significant impact on residential property values at either location.

During FCLP training at Emporia-Greenville, the airfield would be closed to non-Navy aircraft, and, for both alternative locations, conflicting use of the FCLP pattern airspace would generally preclude concurrent operations in the FCLP pattern area, such as civilian aviation, crop dusting, skydiving, sport or glider flying, and similar airfield operations. However, the pattern and runway would be opened to emergency aircraft, as necessary or authorized by the airfield. The Navy's FCLP schedule will be communicated to the airfield prior to operations, and a NOTAM will be published to ensure other airport users are aware of the closure.

A search of literature failed to reveal any impacts to cell phone or television operations. All activities operate within their respective rights and liabilities under Federal Communications Commission (FCC) rules.

Further description of two communities bordering WFF Main Base, including Trails End, which falls partially within the Navy's modeled greater than 65 dB DNL noise zone, and Olde Mill Pointe, which is outside the greater than 65 dB DNL noise zone, has been added to the EA. The boundary of the Olde Mill Pointe development has also been added to Figures 3-17, 3-18, and 3-19. Data and house/dwelling counts for the Trails End community, located at the northern end of Runway 22 (see Figures 3-12, 3-14, and 3-15), and data and figures in the EA related to the community were obtained through county parcel data and tax records. According to a letter posted on the Trails End website (a copy of which

was sent to the Navy during the public comment period), Trails End is a recreational resort with over 2,500 lots consisting of a mixture of cottages, park-model trailers, and travel trailers (the majority are trailers or motor homes). The largest category of Trails End owners is “weekenders,” who primarily visit the community on weekends year-round and during vacations. The Trails End community association considers 300 of the 2,500 lots to be occupied full time. Olde Mill Pointe is a residential development consisting of 99 parcels. Thirteen of the 56 parcels currently available for development have been sold. Individual lots are privately owned and designed for single-family residences. These residences may be for year-round use or seasonal/occasional use (Olde Mill Pointe 2010).

The communities surrounding Emporia-Greenville Regional Airport and WFF Main Base could experience potential economic benefits as a result of the proposed action. Construction on each airfield to support FCLP, expanded service requirements at each airfield to support FCLP, and a lease arrangement for Emporia-Greenville Regional Airport for the use of the airfield would result from the implementation of the proposed action. It would be expected that the Navy would need to contract for services to support FCLP operations at both locations. Additionally, if WFF Main Base is chosen, the Navy could conduct E-2/C-2 FCLP training detachments, in which case there would be potential economic benefits to the local community for dining, lodging, and rental vehicles for 80 to 100 personnel for the period of each detachment. These potential detachments would be approximately 14 days in length and could occur four to six times per year. Note that a detachment would not require any additional infrastructure improvements, as detachments would use facilities that currently exist on base or, in the case that they were not available, would utilize lodging in the community.

1.4.1.6 Pollution

Comment Summary. Several people sent comments about pollution. One commenter suggested that the proposed action could cause an imbalance in the surrounding ecosystem at WFF. Other comments related to pollution included concerns about dumping fuel on farmland, long-term impacts of engine emission residue on crops and soil, impacts to air quality and global warming, and water quality impacts including algal blooms and decreases in sea grasses. One commenter asked whether the Navy had considered the impact of seasonal morning fogs on proposed operations at WFF.

Response. The Navy has analyzed potential impacts to Air Quality (Section 3.4), Water Quality (Section 3.10), and Biological Resources (Section 3.11) and found that there would be no significant impact to any of these resource areas for either alternative. Air emissions have been analyzed and would be expected to remain within the national standards (See Section 3.4 and Appendix C, Air Quality Calculations). The Navy will use best management practices and sediment and erosion control plans in the construction, design, and implementation of the proposed action to avoid or minimize potential impacts on water quality due to sediment runoff (see Section 3.10).

The Navy does not routinely dump fuel from aircraft. To do so would not only be environmentally unsound but also fiscally unsound, given the cost of fuel. If forced to do so because of an emergency, Navy pilots will typically attempt to dump fuel at an altitude at which the fuel would dissipate before reaching the ground and do so over unpopulated areas in accordance with FAA regulations.

1.4.1.7 NEPA and Public Outreach Process

Comment Summary. Several comments questioned whether the Navy addressed the range of reasonable alternatives or questioned the thoroughness of analysis in the EA. Some expressed dissatisfaction with the level of public outreach and the format of the open house meetings. Several comments requested that the Navy publish training schedules for the public. Others wrote that they feel that their concerns/complaints are not important to the Navy and that they believe a decision has already been made. Citizens from areas surrounding both Emporia-Greenville and WFF asked that the Navy perform a flight demonstration so that the public could experience the proposed FCLP operations as they would be performed.

Response. The analysis in this EA meets all statutory and regulatory requirements under NEPA and CEQ regulations. The Navy must follow specific airfield requirements necessary to conduct FCLP. In selecting alternatives, the Navy performed an exhaustive survey of airports that meet the requirements. Only airfields meeting the requirements outlined in Section 1.2.3 were considered as alternatives in this EA. See Section 2.2 for a detailed explanation of the criteria used and the process for alternative selection.

The Navy values the input received from the public and takes this information into consideration prior to making a final decision. The purpose of the public open house is to provide members of the public an opportunity to present their views on the proposed action. The informal format is intended to foster a one-to-one relationship with the public and to address individual concerns. The open house format may also encourage those who do not speak in large crowds to voice their concerns in a more intimate setting. All public comments received during the public comment period are made part of the permanent record and are considered in the final decision.

The Navy's FCLP schedule will be communicated to the airfield prior to operations, and a NOTAM will be published. The NOTAM can be accessed by the public on the FAA website. Additionally, requests for longer-range schedules could be requested through NS Norfolk.

Flight demonstration requests were received from private citizens at both alternative locations. However, at this time, the only local elected government body to have requested a flight demonstration is the Accomack County Board of Supervisors. In response to the request from the Accomack County Board of Supervisors, the Navy conducted an approximately three-hour, five-aircraft (three

E-2 and two C-2 aircraft) flight demonstration at WFF Main Base from 3:00 p.m. to 6:00 p.m. on December 18, 2012.

1.4.1.8 Cost

Comment Summary. The Navy received several comments related to cost of the proposed action. A few people indicated they would not support the proposed action at either site due to its cost to taxpayers, while some noted that they believe utilization of WFF over Emporia-Greenville would be the more cost-effective option because it already has required equipment and would allow pilots to perform a “complete operation.” One comment noted that this proposed action does not ensure that the need to detach to Jacksonville would be eliminated if either alternative is chosen, while another requested that the financial analysis of alternatives be shared with the public.

Response. The purpose of an EA is analysis of the potential environmental impacts associated with the proposed action.

1.4.2 Changes from the Draft EA to the Final EA

In response to input received during the public comment period, the following updates have been made to the Final EA.

■ Executive Summary

- ES.3.1 – The two holding pattern locations for both alternatives were reduced to only one pattern location, the pattern altitude was elevated to at or above 3,500 feet above ground level instead of 2,000 feet, and nighttime operational hours were clarified.
- ES.3.2 – Nighttime operational hours were clarified.
- ES.4.4 – A note regarding the Emporia-Greenville Regional Airport Commission’s agreement to purchase property impacted by the 65 dB DNL was added.
- ES.6 – A note was added to clarify that current aircraft operations would continue at both sites under the proposed action.

■ Chapter 1

- Section 1.4 – This section was expanded following the public meetings.

■ Chapter 2

- Section 2.1 – The two holding pattern locations for both alternatives were reduced to only one pattern location, and the pattern altitude was elevated to at or above 3,500 feet above ground level instead of 2,000 feet; nighttime operational hours were clarified; and a note was added to explain that infrastructure changes to Emporia-Greenville would be subject to FAA review and approval.
- Section 2.2 – Nighttime operational hours were clarified.
- Section 2.3 – An explanation was added of the procurement process as the reason that other commercial airfields that submitted proposals in response to the RFP cannot be released.

- Figure 2-5 – The two holding pattern areas were reduced to one pattern location to the west side of the runway, away from the City of Emporia.
- Figure 2-9 – The original figure was deleted because the holding pattern to the north of WFF was repositioned; subsequent figures were renumbered.

■ **Chapter 3**

- General – Added background on the Trails End and Olde Mill Pointe communities near WFF throughout Chapter 3.
- Section 3.2 – Added explanation of the public process for describing the NOTAM process; BASH data updated based on 2012 WFF Wildlife Hazard Assessment Annual Monitoring Report (see Appendix E).
- Section 3.3 – Additional BASH statistics and background information on BASH management at WFF were added.
- Section 3.4 – A note was added that air quality modeling uses conservative emission factors, and emissions related to the altitude change for the holding pattern would not be more than those previously modeled.
- Section 3.5 – Nighttime operational hours were clarified; a note was added regarding the Emporia-Greenville Regional Airport Commission's agreement to acquire property impacted by the modeled 65 dB DNL noise contour; revised noise contours due to holding pattern changes were incorporated; and updated acreages and the estimated number of properties/residences and population were provided.
- Section 3.6 – Background on the NASA Visitor Center was added; revised land use acreages under noise contours resulting from holding pattern changes were incorporated; FAR Part 150 land use guidance was removed from WFF Main Base land use analysis as it is not applicable to a non-public-use airport.
- Section 3.8 – Explained the visual impacts of light that would be emitted from the Navy's carrier deck lighting.
- Section 3.11 – Analysis of in-air bird strikes was added; the threatened and endangered species action areas were expanded; the WFF bird count information was updated based on the 2012 Wildlife Hazard Assessment Annual Monitoring Report (see Appendix E); additional information on existing bald eagles nests surrounding WFF Main Base was added.
- Section 3.13 – Added counts and categorized public comments received.
- Figures 3-17, 3-18, 3-19, and 3-24 – Added the boundaries for the "Wallops Island National Wildlife Refuge" and "Chincoteague National Wildlife Refuge" and outlines marking Trails End and Olde Mill Pointe subdivisions.

■ **Chapter 4**

- Added changes made in Chapter 3 to Table 4-1, Comparison of Environmental Consequences.

■ **Chapter 5**

- General – Clarified that existing airport operations at both Emporia-Greenville and WFF Main Base would be expected to continue during non-FCLP periods.

- Added analysis of Navy Parachute / Paraglide and related airborne jump training as a Reasonably Foreseeable Project at Emporia-Greenville.

■ **Appendix A**

- Correspondence table was updated and copies of correspondence added.

■ **Appendix B**

- Noise analysis was updated based upon the revision to the holding pattern altitude and position.

■ **Appendix D**

- Public meeting posters and other materials have been added as Appendix D, Public Meeting Materials.

■ **Appendix E**

- The WFF Wildlife Hazard Assessment Annual Monitoring Report (2012) has been added as Appendix E.

1.5 Regulatory and Statutory Requirements

NEPA prescribes an interdisciplinary approach to environmental planning. Under NEPA, the level of significance of potential environmental impacts is determined in order to aid federal agency decision-making. In addition to analyzing the proposed action under the NEPA regulatory requirements, the Navy must also obtain required permits and authorizations before implementing the proposed action or alternatives. In addressing environmental consequences, the Navy is guided by relevant statutes (and their implementing regulations) and Executive Orders (EOs) that establish standards and provide guidance on environmental and natural resource management and planning. The permits and approvals covered by statutes and regulations that may be required for this project are discussed in Section 1.5.2 and summarized in Table 1-2, found at the end of this section.

1.5.1 NEPA and Determination of Significance

Under NEPA, a federal agency's proposed actions can either be "categorically excluded" from further analysis or evaluated in an EA or an EIS. An EA is an analysis of the potential environmental impacts of a proposed action. Action proponents must prepare an EA when they do not know beforehand whether or not the proposed action will significantly affect the human environment or be controversial regarding environmental effects. An EA results in either a Finding of No Significant Impact or, if a significant impact is identified in the EA, a decision to prepare an EIS.

The analysis of potential impacts to resource areas covered in this document and the determination of whether or not any potential impacts may be significant was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 FR 56003, Nov. 29, 1978]. In determining significance, context and intensity, as described in Section 1508.27, were considered for each resource area.

1.5.2 Other Regulatory and Statutory Requirements

Air Quality

The Clean Air Act (CAA) is the primary federal statute governing air pollution. The CAA designates six pollutants as criteria pollutants, for which National Ambient Air Quality Standards have been established to protect public health and welfare (see Table 1-1). The National Ambient Air Quality Standards limit the number of times a pollutant can exceed a specific concentration in the air within a year, based on a specific averaging time. The Commonwealth of Virginia has adopted these federal standards, and, in accordance with 42 U.S.C. 7410, the Commonwealth of Virginia's plan (9 Virginia Administrative Code [VAC] 5-20-80) has been approved by the U.S. Environmental Protection Agency (EPA) at 40 CFR 52.2420.

Areas that do not meet National Ambient Air Quality Standards are designated as being in "nonattainment" for that criteria pollutant. Nonattainment status is further defined by the extent to which the standard is exceeded. There are six classifications of ozone nonattainment status (transitional, marginal, moderate, serious, severe, and extreme) and two classifications of CO and PM₁₀ nonattainment status (moderate and serious). The remaining criteria pollutants have designations of either attainment, nonattainment, or unclassifiable. Areas redesignated from nonattainment to attainment are commonly referred to as maintenance areas, indicating that the area is in attainment but subject to an EPA-approved maintenance plan for a specific pollutant.

The General Conformity Rule has been promulgated by the EPA to ensure that federal actions conform to the applicable State Implementation Plan. General Conformity Rule requirements are only applicable to federal actions within non-attainment or maintenance areas and therefore are not applicable to the proposed action being analyzed in this document.

Under the CAA, Prevention of Significant Deterioration applies to new, major stationary sources or major modifications at existing stationary sources for pollutants where the area in which the source is located is in attainment or unclassifiable with the National Ambient Air Quality Standards. Prevention of Significant Deterioration permits prevent the air quality in clean areas from deteriorating to the level set by the National Ambient Air Quality Standards. Although Prevention of Significant Deterioration thresholds do not apply to mobile and temporary emissions, they provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards.

Table 1-1 National Ambient Air Quality Standards

National Ambient Air Quality Standards Standard Parameters					
Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3-month average	0.15 µg/m ³ ⁽¹⁾	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98 th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb ⁽²⁾	Annual mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [71 FR 61144, Oct 17, 2006]	PM _{2.5}	primary and secondary	Annual	15 µg/m ³	Annual mean, averaged over 3 years
			24-hour	35 µg/m ³	98 th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb ⁽⁴⁾	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

U.S. EPA 2011

Notes:

- (1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
- (2) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
- (3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
- (4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO₂ standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Key:

- µg/m³ = Micrograms per cubic meter.
 mg/m³ = Milligrams per cubic meter.
 PM₁₀ = Particulate matter less than 10 microns in diameter.
 PM_{2.5} = Particulate matter less than 2.5 microns in diameter.
 ppm = Parts per million.

Federal agencies are also required to address emissions of greenhouse gases with analysis and emissions planning. The EPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009. This was followed by EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, signed in October 25, 2009, which requires federal agencies to increase energy efficiency; measure, report, and reduce greenhouse gas emissions; protect waterways with stormwater management; control waste; and support sustainable technology and efficient building practices. In October 2010, the CEQ issued *Guidance on Federal Greenhouse Gas Accounting and Reporting* to establish federal requirements for greenhouse gas reporting in compliance with EO 13514.

Greenhouse gas emissions occur locally, but greenhouse gases are both global in scale and cumulative over time. Therefore, greenhouse gas emissions are discussed in Section 5.1.2.3.

Land Use

Virginia Coastal Zone Management. The Coastal Zone Management Act of 1972, as amended, was enacted to develop a national coastal management program that comprehensively manages competing uses of coastal resources. The National Coastal Zone Management Program, administered by the National Oceanic and Atmospheric Administration (NOAA), seeks to balance coastal resource use with environmental conservation. A federal agency may decide that the proposed action will have no effects upon a state's coastal uses or resources and may submit a negative determination supporting the agency's position. Or, an agency may determine that the proposed action is likely to affect the coastal zone and submit a consistency determination indicating that the proposed action will be undertaken in a manner that is consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved management program.

The Virginia Coastal Zone Management Program, approved by NOAA in 1986, designates the Virginia Department of Environmental Quality (VDEQ) as the lead agency with authority to oversee activities in the coastal zone of the Commonwealth of Virginia. The Virginia Coastal Zone Management Program includes enforceable programs and policies that pertain to tidal and non-tidal wetlands, fisheries, subaqueous lands, dunes and beaches, point-source air pollution, point-source water pollution, non-point-source water pollution, shoreline sanitation, and coastal lands management.

Water Resources

Wetlands. Under Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.), the U.S. Army Corps of Engineers (USACE) regulates wetlands and waterways meeting the definition of "waters of the United States" (33 CFR 328). The CWA defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically

adapted for life in saturated soil conditions. USACE permits are required for the discharge of dredged or fill material into wetlands and other waters of the United States. Wetlands are identified based on specific soil, hydrology, and vegetation criteria defined by the USACE (1987).

Under the authority of EO 11990, *Protection of Wetlands*, federal agencies are required to adopt a policy to avoid to the greatest extent possible the long- and short-term adverse impacts associated with the destruction and modification of wetlands. Federal agencies are also required to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative. In addition, mitigation requirements under Section 404 of the CWA and USACE guidelines emphasize a policy of wetland avoidance, minimization, and compensation (i.e., restoration, creation, or enhancement) when impacts are unavoidable.

Stormwater Management. The CWA established the basic framework for regulating discharges of pollutants into the waters of the United States. The Clean Water Act National Pollutant Discharge Elimination System (33 U.S.C. 1342) requires permits for stormwater discharges associated with industrial activities. The VDEQ is authorized to carry out National Pollutant Discharge Elimination System permitting under the Virginia Pollutant Discharge Elimination System (9 VAC 25-151).

The Virginia Stormwater Management Program Permit Regulations (4 VAC 50-60-10 et seq.), administered by the Virginia Department of Conservation and Recreation (VDCR), require that construction and land development activities incorporate measures to protect aquatic resources from the effects of increased volume, frequency, and peak rate of stormwater runoff and from increased non-point-source pollution carried by stormwater runoff. The Virginia Stormwater Management Program also requires that a Stormwater Pollution Prevention Plan be developed for land-disturbing activities of 1 acre or greater and that a permit be acquired from VDCR prior to construction.

Virginia's Erosion and Sediment Control Program (4 VAC 50-50-10 et seq.) requires preparation of an erosion control plan for construction activities when land disturbance is greater than 10,000 square feet (0.23 acre). The purpose of the program is to control soil erosion, sedimentation, and runoff from land-disturbing activities to prevent degradation of property and natural resources.

Biological Resources

Marine Mammals. Marine mammals are protected under the Marine Mammal Protection Act of 1972, amended in 1994, administered by the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS). The Marine Mammal Protection Act prohibits the "take" of any marine mammal, which is defined by NMFS as to "harass, hunt, capture, collect, kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal." The National Defense Authorization Act of Fiscal Year 2004 (Public Law 108-136) amended the definition of harassment and adopted the definition of "military

readiness activity” as set forth in the Fiscal Year 2003 National Defense Authorization Act (Public Law 107-314). The proposed action constitutes military readiness activities as defined in Public Law 107-314. For military readiness activities, the relevant definition of harassment is any act that (1) injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (“Level A harassment”) or (2) disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (“Level B harassment”) [16 U.S.C. § 1362 (18)(B)(i) and (ii)].

Congress has defined military readiness as all training and operations of the armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.

Avian Resources. Most migratory and native-resident bird species are protected under the Migratory Bird Treaty Act, which prohibits the taking, killing, or possessing of migratory birds except under the terms of a valid permit issued pursuant to federal regulations. The armed forces are authorized to incidentally take migratory birds during military readiness activities, where “incidental take” refers to a take that results by the way of, but is not the purpose of, carrying out an otherwise lawful activity. However, if a military readiness activity may have a significant adverse effect on a population of migratory birds, the armed forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate those adverse effects. Routine maintenance of aircraft at an airfield or construction of support infrastructure are considered nonmilitary-readiness activities. The responsibility of federal agencies to protect migratory birds and how to incorporate conservation efforts into their routine operations and construction activities are addressed in a Memorandum of Understanding between DOD and the USFWS, “*Responsibilities of Federal Agencies to Protect Migratory Birds*.” The FCLP operations proposed for Emporia-Greenville or WFF Main Base would constitute military readiness.

Additionally, the bald eagle (*Haliaeetus leucocephalus*) is federally protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) and by the Migratory Bird Treaty Act. The Bald and Golden Eagle Protection Act prohibits the taking of bald or golden eagles, including their parts, nests, or eggs. The Bald and Golden Eagle Protection Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

Federally Threatened and Endangered Species. The ESA (16 USC 1531-1544) authorizes the determination and listing of species as “endangered” and “threatened” and provides regulatory protection for listed species. The USFWS and NOAA/NMFS share responsibility for conservation and recovery of threatened and endangered species and conservation of designated critical habitat required for the survival and recovery of listed species. Generally, USFWS manages land and freshwater species, while NMFS manages marine and

anadromous species. Section 7(a)(2) of the ESA requires all federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any species listed as endangered or threatened, or result in the destruction or adverse modification of designated critical habitat of such species. If a proposed Navy action may affect a federally listed endangered or threatened species or designated critical habitat, the Navy must initiate consultation with the USFWS or the NMFS, as appropriate. Analysis of impacts to candidate species is not required under the ESA. However, the USFWS and NMFS encourage conservation efforts for candidate species because they may warrant future protection under the ESA.

Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR Part 800) require that federal agencies consider the effects of their undertakings on historic properties. Cultural resources may include archaeological resources (prehistoric and historic archaeological sites) and architectural resources (historic buildings and structures). Historic properties are those cultural resources that have been included in, or determined eligible for inclusion in, the National Register of Historic Places.

Socioeconomics

Environmental Justice. In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Environmental Justice), was issued to focus the attention of federal agencies' actions on human health and environmental conditions in minority and low-income populations. This EO was also established to ensure that, if there were disproportionately high and adverse human health or environmental effects of federal actions on these populations, those effects would be identified and addressed. Environmental justice is achieved if minority and low-income communities are not subjected to disproportionately high or adverse environmental effects.

The Council on Environmental Quality (CEQ 1997) has issued the following guidance to federal agencies on the terms used in EO 12898:

- **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.
- **Minority.** An individual who is a member of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; African American, 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 percent, 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 exceeds or is 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.

Protection of Children from Environmental Health Risks and Safety Risks.

Established in 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, mandates that federal agencies identify and assess environmental health and safety impacts that may disproportionately burden children as a result of the implementation of federal policies, programs, activities, and standards (62 *Federal Register* [FR]19883-19888). The EO does not specify an age range for children, but the EPA defines children as up to 21 years of age (U.S. EPA 2012). The EO recognizes that disproportionate impacts on children may result because “children’s neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children’s size and weight may diminish their protection from standard safety features; and children’s behavior patterns may make them more susceptible to accidents

because they are less able to protect themselves” (62 FR 19883-19888). Environmental health and safety risks are considered “risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest,” such as air, food, water, soil, and manufactured products (62 FR 19883-19888).

Environmental Management

The use, handling, storage, transportation, and disposal of hazardous materials, hazardous waste, and solid waste are regulated by federal and state agencies. The primary federal agencies that govern this are the EPA, the U.S. Occupational Safety and Health Administration, and the U.S. Department of Transportation (DOT).

Hazardous and solid waste disposal is regulated under the Resource Conservation and Recovery Act (RCRA) and programs implemented by the state. Underground storage tanks and aboveground storage tanks are regulated in Virginia by the VDEQ and the State Water Control Board (VDEQ 2011b, VDEQ 2011c). The EPA’s National Priorities List and Comprehensive Environmental Response, Compensation, and Liability Information System contain information on contaminated and potentially contaminated sites. The EPA legislates the creation of Spill Prevention, Control, and Countermeasure Plans for facilities holding an amount of fuel over a certain threshold and/or located near a navigable water of the U.S. (40 CFR Part 112).

Table 1-2 Applicable Regulations

Regulation	Agency or Agencies	Permit	Regulated Activity
Clean Air Act of 1970 (42 U.S.C. 7401 <i>et seq.</i>)	■ U.S. Environmental Protection Agency	Conformity determination	Federal actions in areas of nonattainment or maintenance consistent with the General Conformity Rule
Executive Order 13514, <i>Federal Leadership in Environmental, Energy, and Economic Performance</i> (October 25, 2009)	■ President Obama	Requirement for the federal government to increase energy efficiency; measure, report, and reduce greenhouse gas emissions; protect waterways with stormwater management; control waste; and support sustainable technology and efficient building practices	Federal actions related to energy consumption.
Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451, <i>et seq.</i>)	■ Virginia Department of Environmental Quality	Coastal Consistency Determination that a federal action is consistent with the enforceable policies of the Virginia Coastal Zone Management Program to the maximum extent practicable.	Federal actions that have reasonably foreseeable impacts on Virginia's coastal resources.

Table 1-2 Applicable Regulations

Regulation	Agency or Agencies	Permit	Regulated Activity
Clean Water Act of 1977 (33 U.S.C. 1251 <i>et seq.</i>)	<ul style="list-style-type: none"> ■ U.S. Environmental Protection Agency ■ U.S. Army Corps of Engineers ■ Virginia Department of Environmental Quality 	<ul style="list-style-type: none"> ■ National Pollutant Discharge Elimination System Permit (the Virginia Department of Environmental Quality is authorized to carry out this permitting under the Virginia Pollutant Discharge Elimination System (9 VAC 25-151) ■ Joint Permit Application, Section 404 and Section 401 Water Quality Certificate ■ Virginia Erosion and Sediment Control Program (4 VAC 30-50) 	<ul style="list-style-type: none"> ■ Construction or operation of facilities that may result in any discharge into navigable waters ■ Discharge or fill activities in wetlands or waters of the United States ■ Construction activities resulting in land disturbance of greater than 10,000 square feet (0.23 acre)
Executive Order 11990: <i>Protection of Wetlands</i> (May 1977)	<ul style="list-style-type: none"> ■ President Carter 	Requirement to avoid the long- and short-term adverse impacts associated with the destruction and modification of wetlands, to the greatest extent possible.	Requires federal agencies to adopt a policy to avoid, to the greatest extent possible, the long- and short-term adverse impacts associated with the destruction and modification of wetlands. Federal agencies are also required to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.
Marine Mammals Protection Act of 1972, amended in 1994 (16 U.S.C. 1361 <i>et seq.</i>)	<ul style="list-style-type: none"> ■ U.S. Fish and Wildlife Service ■ National Marine Fisheries Service 	Incidental take permit	Prohibits the “take” (defined as harassment, hunting, capturing, collecting, killing, or attempting to do any of these things) of any marine mammal.

Table 1-2 Applicable Regulations

Regulation	Agency or Agencies	Permit	Regulated Activity
Migratory Bird Treaty Act (16 U.S.C. 703 <i>et seq.</i>)	■ U.S. Fish and Wildlife Service	Incidental take permit	Prohibits the taking, killing, or possessing of migratory birds (defined as both migratory and most native-resident bird species) except under the terms of a valid incidental take permit.
Bald and Golden Eagle Protection Act (16 U.S.C. 668)	■ U.S. Fish and Wildlife Service	Permit to remove or relocate an eagle nest, scientific collecting permit, or an exhibition permit	Prohibits the “take” of bald and golden eagles (<i>Haliaeetus leucocephalus</i> and <i>Aquila chrysaetos</i> , respectively), including their parts, nests, or eggs.
Federal Endangered Species Act (16 U.S.C. 1531 <i>et seq.</i>)	■ U.S. Fish and Wildlife Service ■ National Marine Fisheries Service	Agency consultation for presence of federally threatened and endangered species	Actions that “may affect” federally threatened or endangered species
National Historic Preservation Act of 1966 as amended (16 U.S.C. 470 <i>et seq.</i>) and its implementing regulations (36 CFR 800)	■ Advisory Council on Historic Preservation ■ Virginia Department of Historic Resources (e.g., State Historic Preservation Office)	Section 106 Review, agency consultation on cultural resources	Federal undertakings that affect properties on or determined to be eligible for listing on the National Register of Historic Places
Executive Order 12898: <i>Federal Actions to Address Environmental Justice in Minority and Low-Income Populations</i> (February 1994)	■ President Clinton	Requirement for environmental justice	Requires that if there are disproportionately high or adverse human health or environmental effects of federal actions on minority and/or low-income populations, those effects are identified and addressed.
Executive Order 13045: <i>Protection of Children from Environmental Health Risks and Safety Risks</i> (April 1997)	■ President Clinton	Requirement for protection of children	Requires that federal agencies identify and assess environmental health and safety impacts that may disproportionately burden children as a result of the implementation of federal policies, programs, activities, and standards.

Table 1-2 Applicable Regulations

Regulation	Agency or Agencies	Permit	Regulated Activity
Resource Conservation and Recovery Act (42 U.S.C. 6901 <i>et seq.</i>)	<ul style="list-style-type: none"> ■ VDEQ and State Water Control Board ■ U.S. Environmental Protection Agency 	Requirement for creation of Pollution Prevention and Spill Prevention, Control, and Countermeasure plans	Requirement for control of hazardous wastes, including its use, handling, storage, transportation, and disposal. Underground and aboveground storage tanks
Federal Aviation Regulations (14 CFR 77 and 14 CFR 157)	<ul style="list-style-type: none"> ■ Federal Aviation Administration 	Effects determination by FAA following aeronautical review at Emporia-Greenville Regional Airport	Construction, alteration, activation, and deactivation of airports

2

Proposed Action and Alternatives

This section describes the proposed action and alternatives for use of the airfield facilities at Emporia-Greenville or WFF Main Base, including the No Action Alternative. The section also discusses several alternatives that were considered but eliminated from further analysis.

2.1 Proposed Action

The proposed action is to acquire the use of an additional local airfield to support FCLP for E-2/C-2 squadrons operating from NS Norfolk Chambers Field. The proposed action also includes minor modifications to the airfield infrastructure to support FCLP operations.

2.1.1 Operations

To meet the FCLP training requirements for approximately 150 pilots assigned to the five fleet E-2 squadrons, one fleet C-2 squadron, and the E-2/C-2 FRS, approximately 20,000 FCLP passes are required annually. Since a pass is composed of two operations (a landing or low approach followed by an immediate takeoff or climb out), 20,000 passes equates to 40,000 operations. In addition, aircraft arrivals to, and departures from, the airfield, as well as holding patterns, account for an additional 5,000 annual operations. Holding pattern operations support in-flight crew position changes and would be limited to one pattern area to be conducted at or above 3,500 feet above the ground.

The five fleet E-2 squadrons and one fleet C-2 squadron presently conduct the majority of their FCLP training at NALF Fentress. As a result of periodic FCLP capacity shortfalls at NALF Fentress, the E-2/C-2 FRS completes the majority of its FCLP training at NOLF Whitehouse by conducting four to six 10-day FCLP detachments to NAS Jacksonville, Florida, annually.

The use of local airfield facilities at either Emporia-Greenville or WFF Main Base for E-2/C-2 FCLP would serve as an interim bridge to manage FCLP capacity shortfalls at NALF Fentress until the Navy addresses local FCLP capacity shortfalls on a more permanent basis.

Carrier landings at night are considerably more difficult than daytime landings due to the lack of visual cues. Because a significant portion of combat and combat support operations are conducted at night, FCLP training includes nighttime training to ensure proficiency.

Approximately half of the proposed Navy E-2/C-2 training would be conducted during daylight hours and half during hours of darkness. For the purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours, and would end as soon as possible. Because sunset occurs later during the long daylight hours of the summer months, FCLP training that begins after sunset may continue as late as 1:00 a.m., or later.

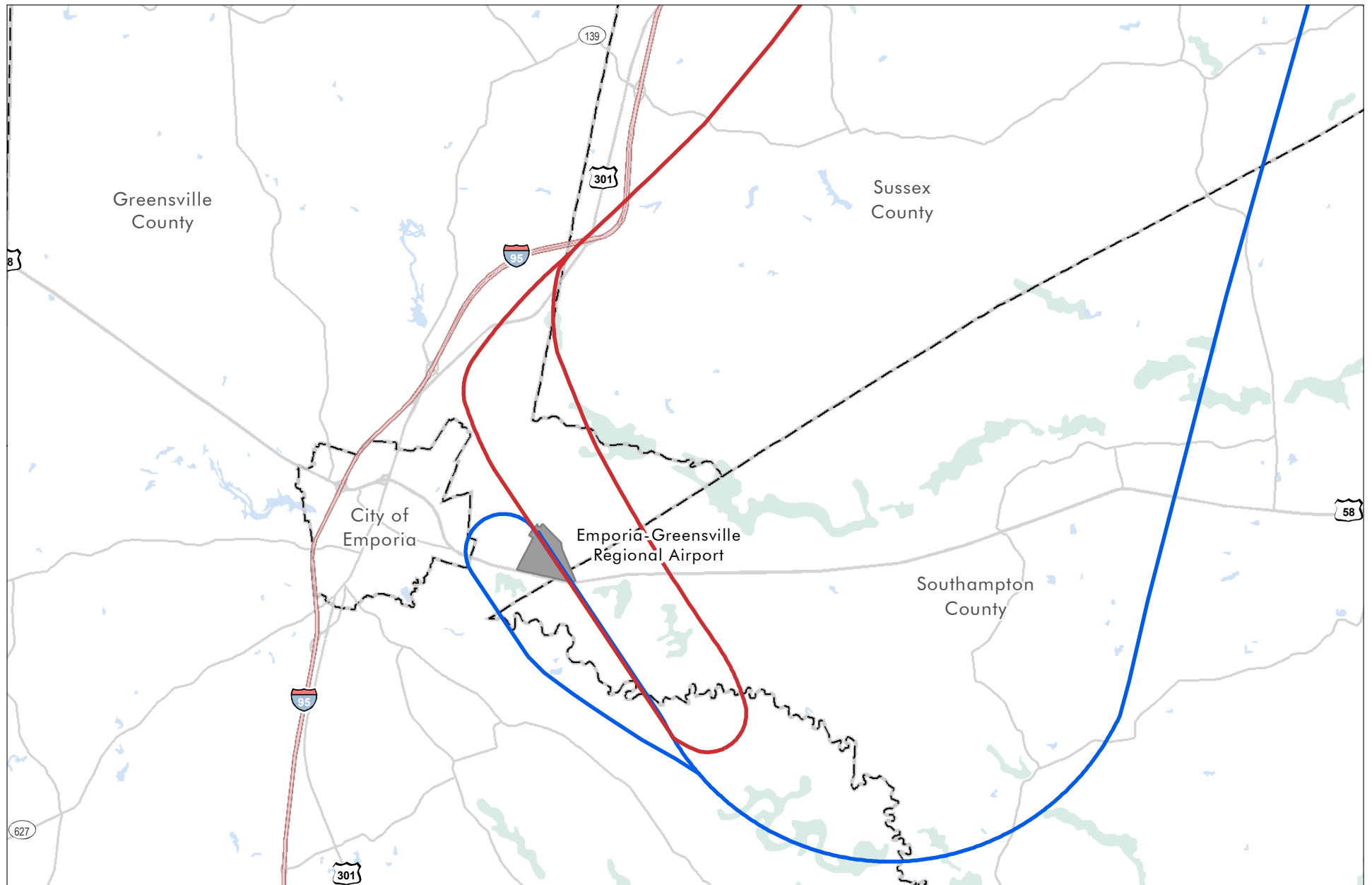
Depending on scheduling and training requirements, operations can be conducted between 15 and 20 days in a given month, throughout the year. This can result in up to 835 operations (30 training hours) in a 5-day week, typically Monday through Friday, or up to 3,340 operations (120 training hours) each month. To accommodate missed or cancelled periods due to poor weather conditions, or to support surge operations, the Navy can require the use of the airfield at any time. While the overall average annual requirement would remain the same, there could be periods of increased use followed by periods of little or no use. The Navy will manage the FCLP schedule in coordination with the airfield.

FCLP training requires the installation of visual landing aids adjacent to the landing area. During FCLP training, the airfield's active runway would be closed to non-FCLP arrivals and departures, generally precluding concurrent operations, such as civilian aviation, crop dusting, skydiving, sport or glider flying, and similar airfield operations. However, the pattern would be opened to emergency aircraft, as necessary.

2.1.1.1 Flight Routes and Flight Tracks

Aircraft would transit between NS Norfolk Chambers Field and Emporia-Greenville or WFF Main Base at altitudes between 4,000 and 8,000 feet above ground level following flight routes based on currently approved arrival and departure procedures out of NS Norfolk Chambers Field (see Figures 2-1, 2-2, and 2-3), then enter into the FCLP pattern at Emporia-Greenville or WFF Main Base. Factors that could affect aircraft cruising altitude include local and transiting traffic density and weather.

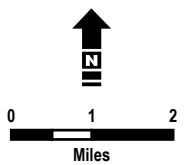
FCLP patterns and holding areas for the proposed operations are represented by flight tracks. Flight tracks are shown as single lines on maps or other graphics and are an approximate representation of the route of the aircraft over the ground. Actual individual aircraft flight tracks can vary due to aircraft performance, pilot technique, airport traffic conditions, and weather conditions, such that the actual flight track is better thought of as a band rather than a single line. Notional FCLP and holding pattern flight tracks for Emporia-Greenville are shown in Figures 2-4 and 2-5 and are shown in Figures 2-6, 2-7, and 2-8 for WFF Main Base. These flight tracks are used to conduct the noise analysis, presented in Chapter 4.

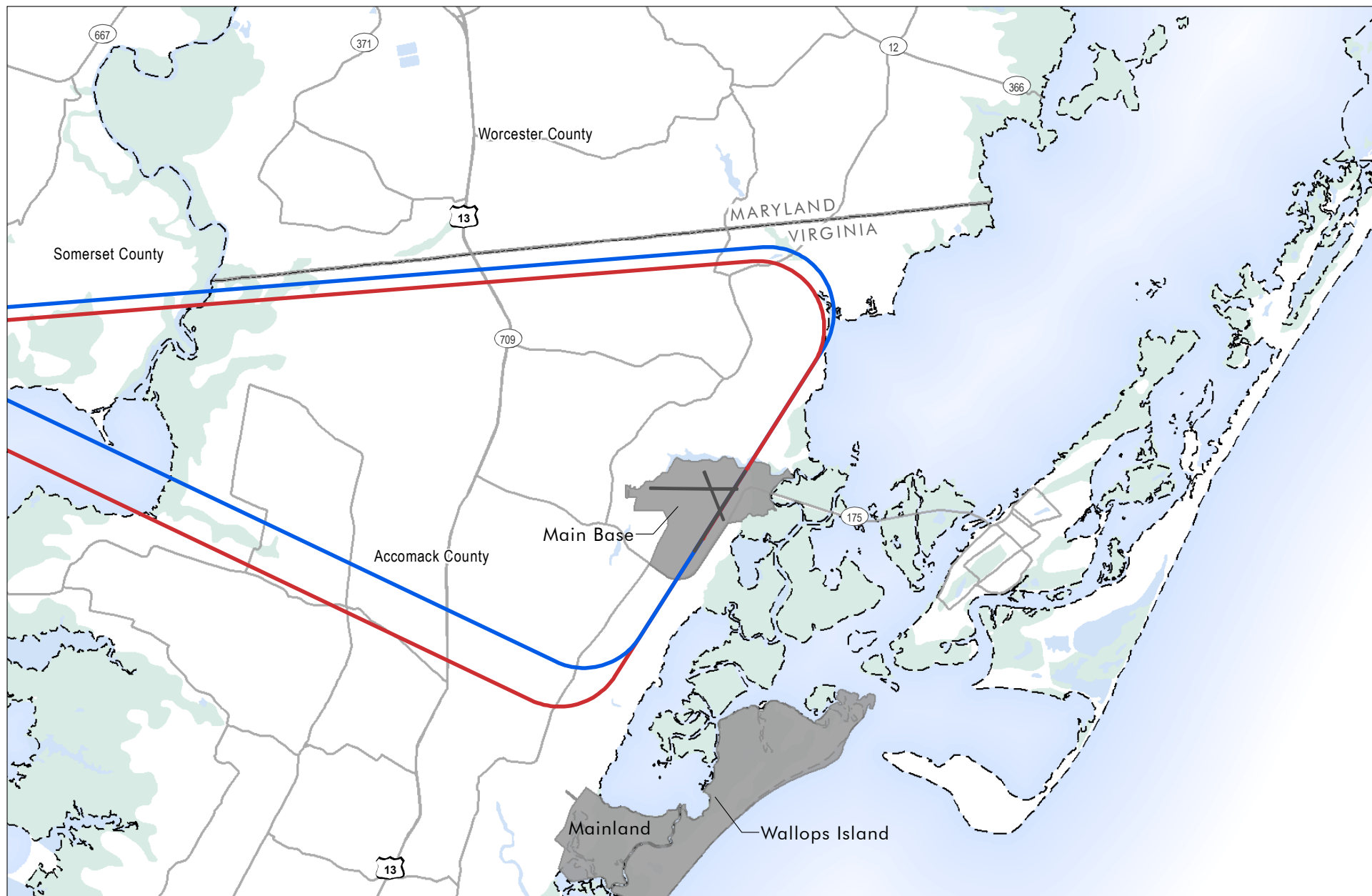


Source: ESRI 2010; NAIP 2010.

- Arrival Flight Route
- Departure Flight Route
- Emporia-Greenville Regional Airport
- Interstate
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh

Figure 2-1
Arrival and Departure Flight Routes
Emporia-Greenville Regional Airport

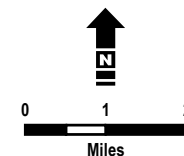


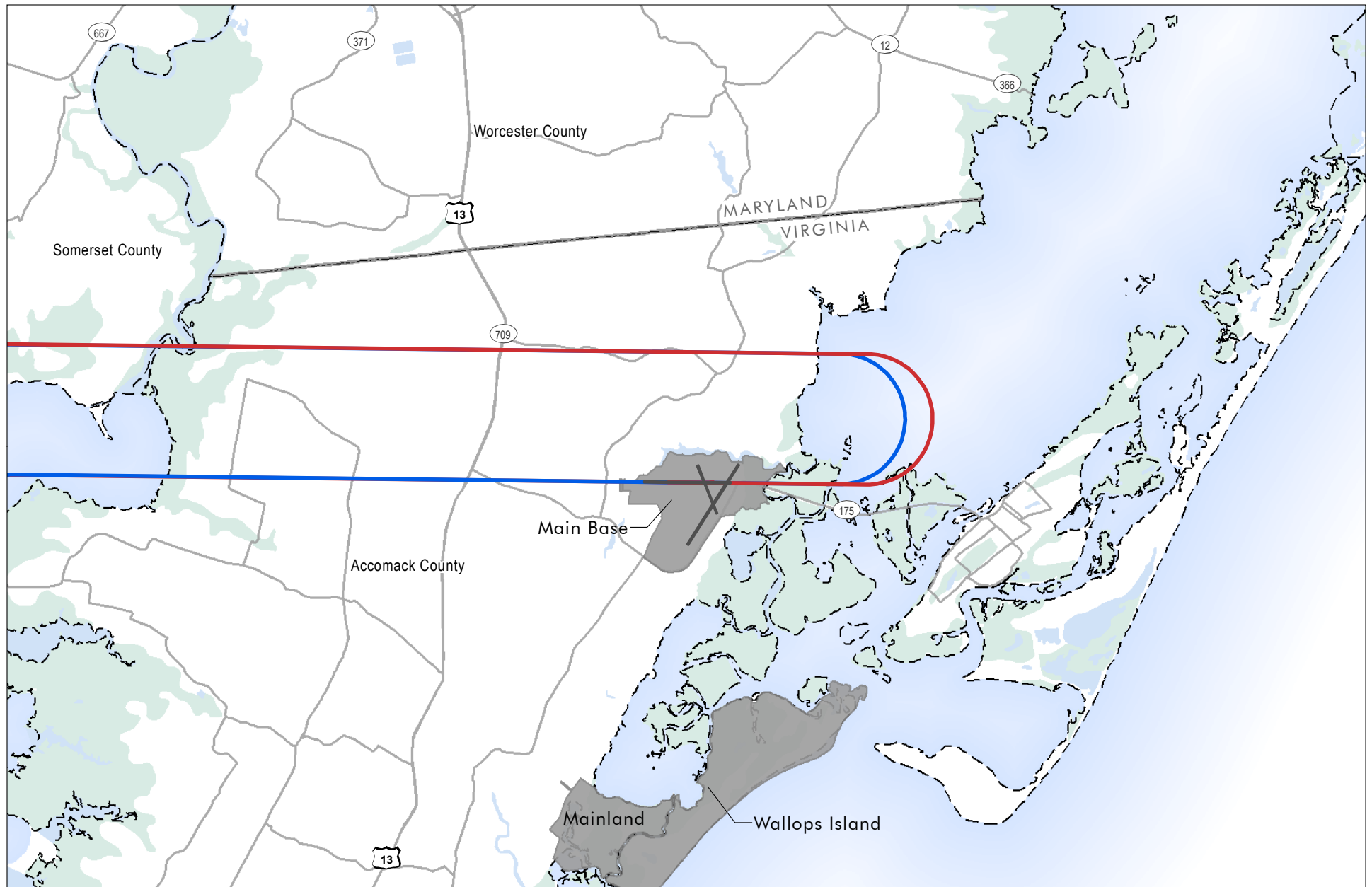


Source: ESRI 2010.

- Arrival Flight Route
- Departure Flight Route
- Active Runway
- Installation Area
- Major Highway
- · - County Boundary
- Waterbody
- Swamp/Marsh

Figure 2-2
Wallops Flight Facility Arrival and Departure Flight Routes
Runways 04 and 22
 Wallops Flight Facility

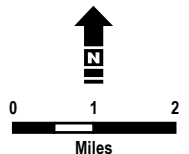


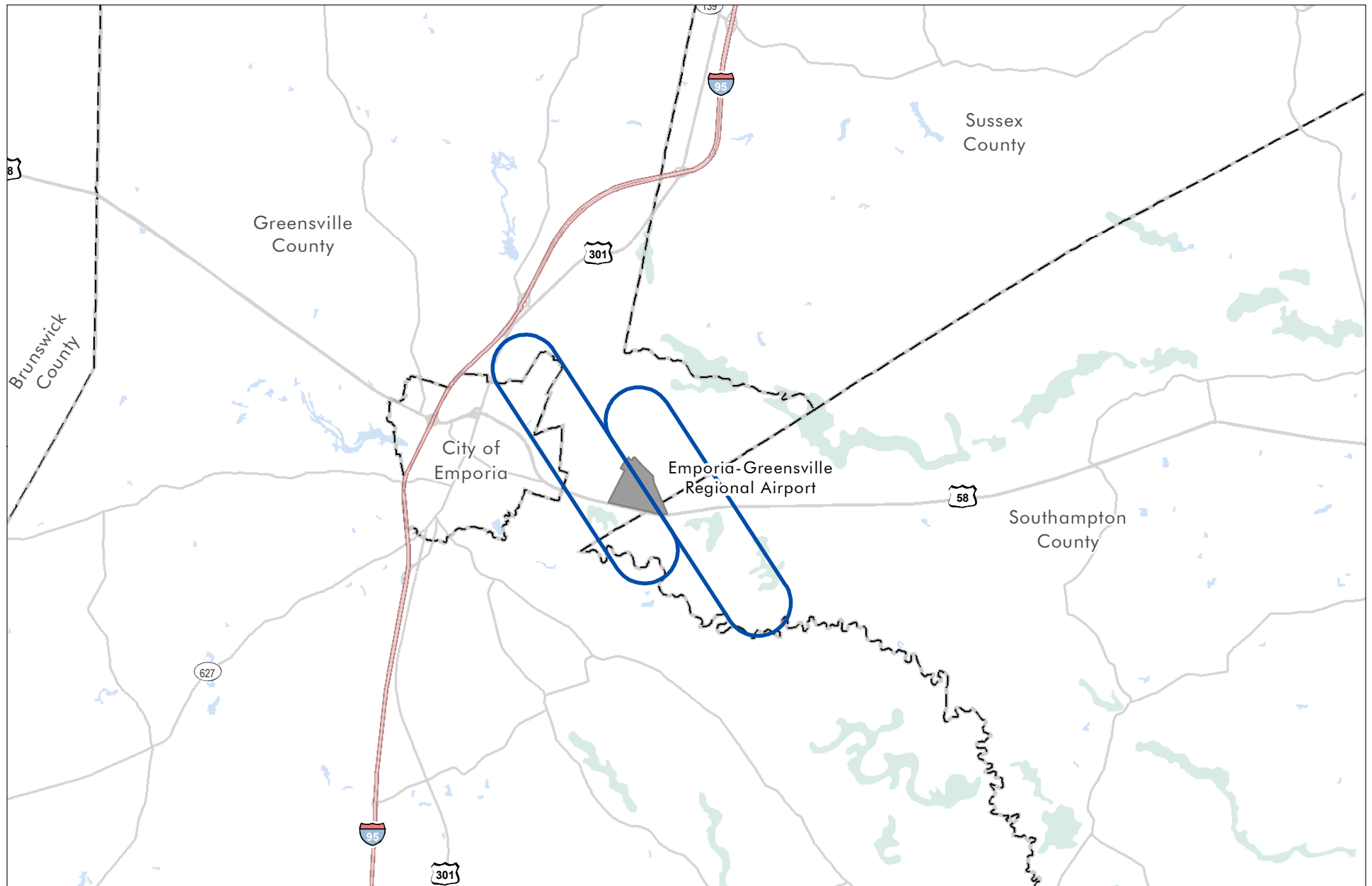


Source: ESRI 2010.

Figure 2-3
Wallops Flight Facility Arrival and Departure Flight Routes
Runways 10 and 28
 Wallops Flight Facility

- Arrival Flight Route
- Departure Flight Route
- Active Runway
- Installation Area
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh

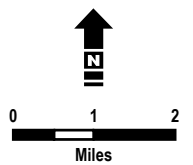


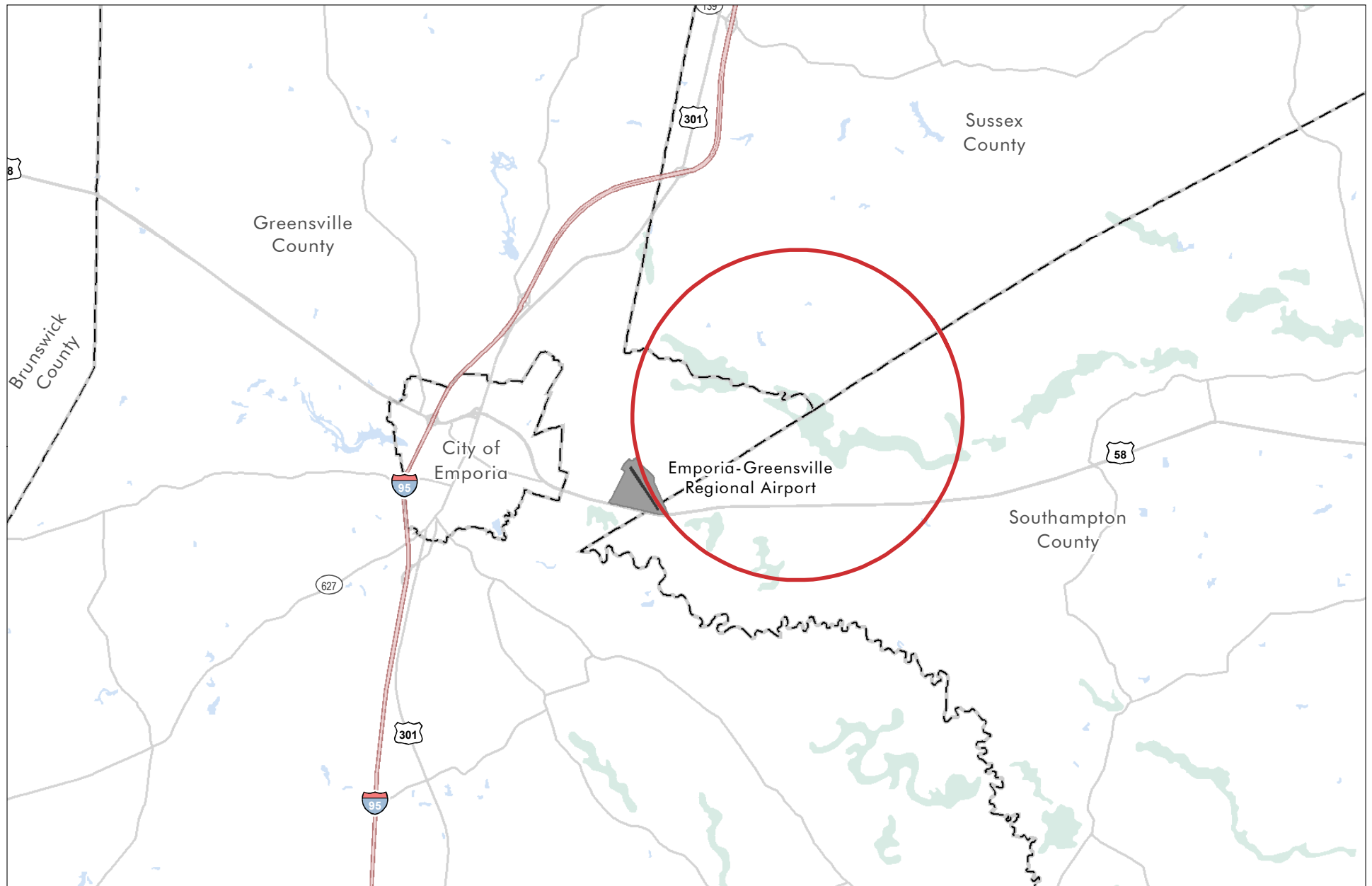


Source: ESRI 2010; NAIP 2010.

- FCLP Flight Tracks
- Interstate
- Emporia-Greenville Regional Airport
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh

Figure 2-4
Emporia FCLP Flight Tracks
 Emporia-Greenville Regional Airport

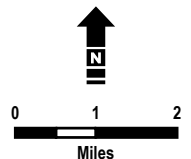


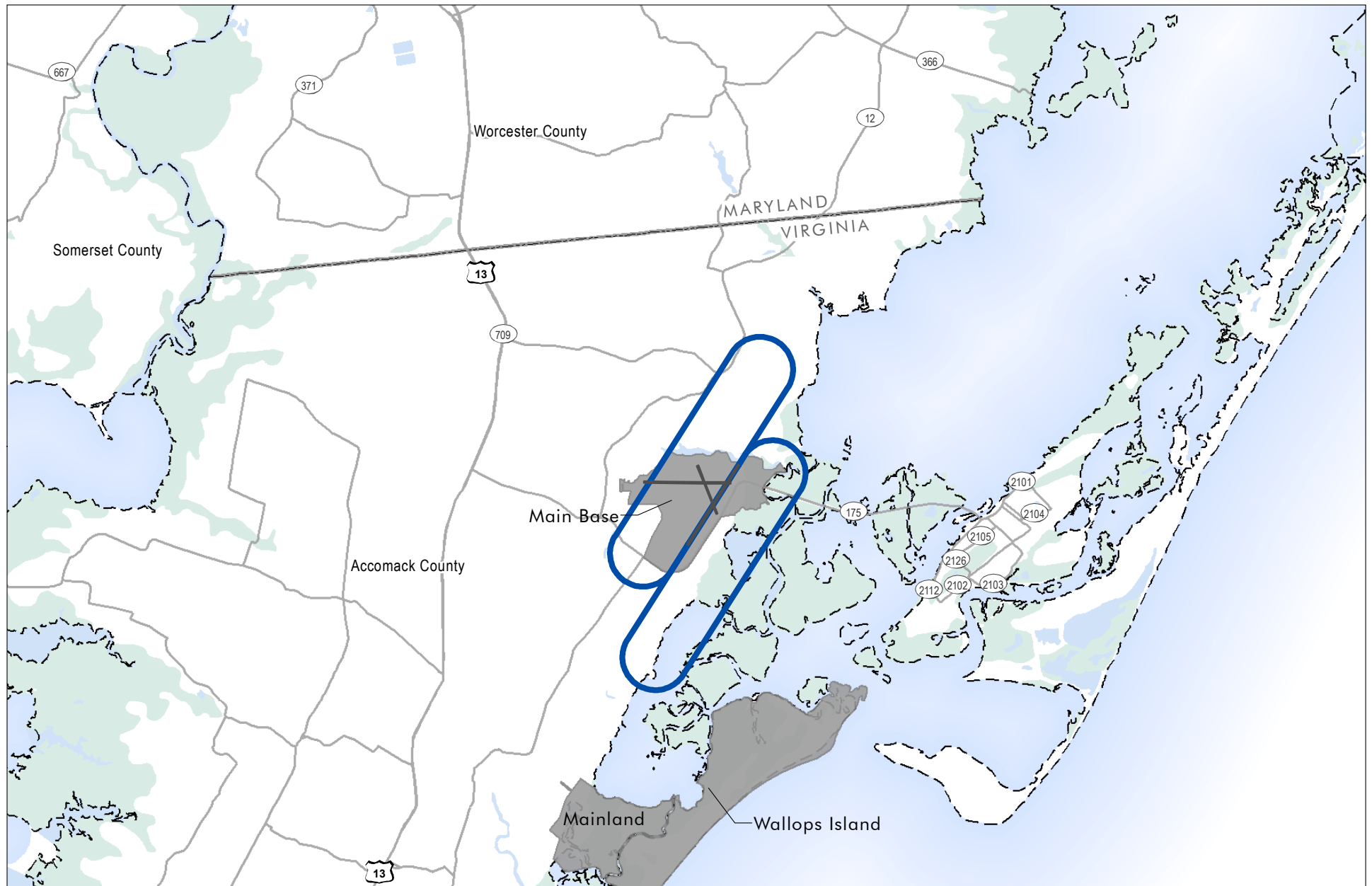


Source: ESRI 2010; NAIP 2010.

- | | |
|--|--|
| — Holding Area (at 3,500 feet) | — Interstate |
| ■ Active Runway | — Major Highway |
| ■ Emporia-Greenville Regional Airport | — County Boundary |
| | ■ Waterbody |
| | ■ Swamp/Marsh |

Figure 2-5
Emporia-Greenville Holding Area
 Emporia-Greenville Regional Airport

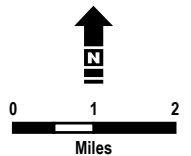




Source: ESRI 2010.

Figure 2-6
Wallops Flight Facility FCLP Flight Tracks
Runways 04 and 22
 Wallops Flight Facility

- FCLP Flight Tracks
- Active Runway
- Installation Area
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh

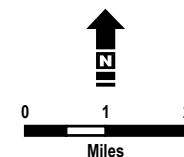




Source: ESRI 2010.

Figure 2-7
Wallops Flight Facility FCLP Flight Tracks
Runways 10 and 28
 Wallops Flight Facility

- FCLP Flight Tracks
- Active Runway
- Installation Area
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh

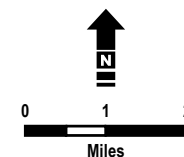




Source: ESRI 2010.

Figure 2-8
Wallops Flight Facility Holding Area
 Wallops Flight Facility

- Holding Area (at 3,500 feet)
- Active Runway
- Installation Area
- Major Highway
- County Boundary
- Waterbody
- Swamp/Marsh



When conducting a standard FCLP pattern (see Figure 2-9), a pilot flies in a left-hand, racetrack-shaped pattern aligned with the runway. The pilot descends to an initial altitude of 1,200 feet above ground level approximately 3 nautical miles from the runway threshold and then descends to an altitude of 800 feet above ground level for the overhead arrival into the FCLP pattern. The actual FCLP pattern is flown at 600 feet above ground level.

Figure 2-4 depicts the flight track for the proposed E-2/C-2 FCLP at Emporia-Greenville using Runway 15/33. If Emporia-Greenville is selected, both ends of the runway would be utilized for E-2/C-2 FCLP operations, with an approximate runway utilization of 47 percent of the operations occurring on Runway 15 and 53 percent of the operations occurring on Runway 33.

Figure 2-6 depicts the flight track for the proposed E-2/C-2 FCLP at WFF Main Base using Runway 04/22, while Figure 2-7 depicts the FCLP flight track at WFF Main Base using Runway 10/28. If WFF Main Base is selected, two of the four runway ends at WFF would be utilized for E-2/C-2 FCLP operations if operations would be conducted during the day and at night (i.e., under either Scenario 1 or Scenario 2); however, daytime-only FCLP operations could be conducted on up to four runway ends. This option (conduct daytime operations on four runway ends) is covered under the analysis for Scenarios 1 and 2 for WFF since noise contours and flight tracks for this option would fall within those modeled for these two scenarios (see Section 2.2 for more discussion of scenarios analyzed for both Emporia-Greenville and WFF Main Base).

During the FCLP flight period, the aircraft could periodically enter into a holding pattern around the airfield at or above 3,500 feet above ground level. Figure 2-5 depicts the proposed holding area at Emporia-Greenville and Figure 2-8 depicts the proposed holding area at WFF Main Base. Due to airspace restrictions related to the launch facility on Wallops Island, the holding pattern for both runways are positioned outside of the launch facility's restricted airspace.

2.1.2 Project Schedule and Duration of the Action

Construction would be scheduled to be completed by July 2013, with initial operating capability (i.e., the point at which airfield modifications would be sufficiently completed to allow for FCLP operations by the E-2/C-2 squadrons) shortly thereafter.

If Emporia-Greenville, a publically owned airfield (see Figure 1-2), is chosen, the term of the Navy's proposed lease would be 1 year, with nine 1-year options, renewable at the sole option of the Navy. Thus, the potential total term for this action could be 10 years.

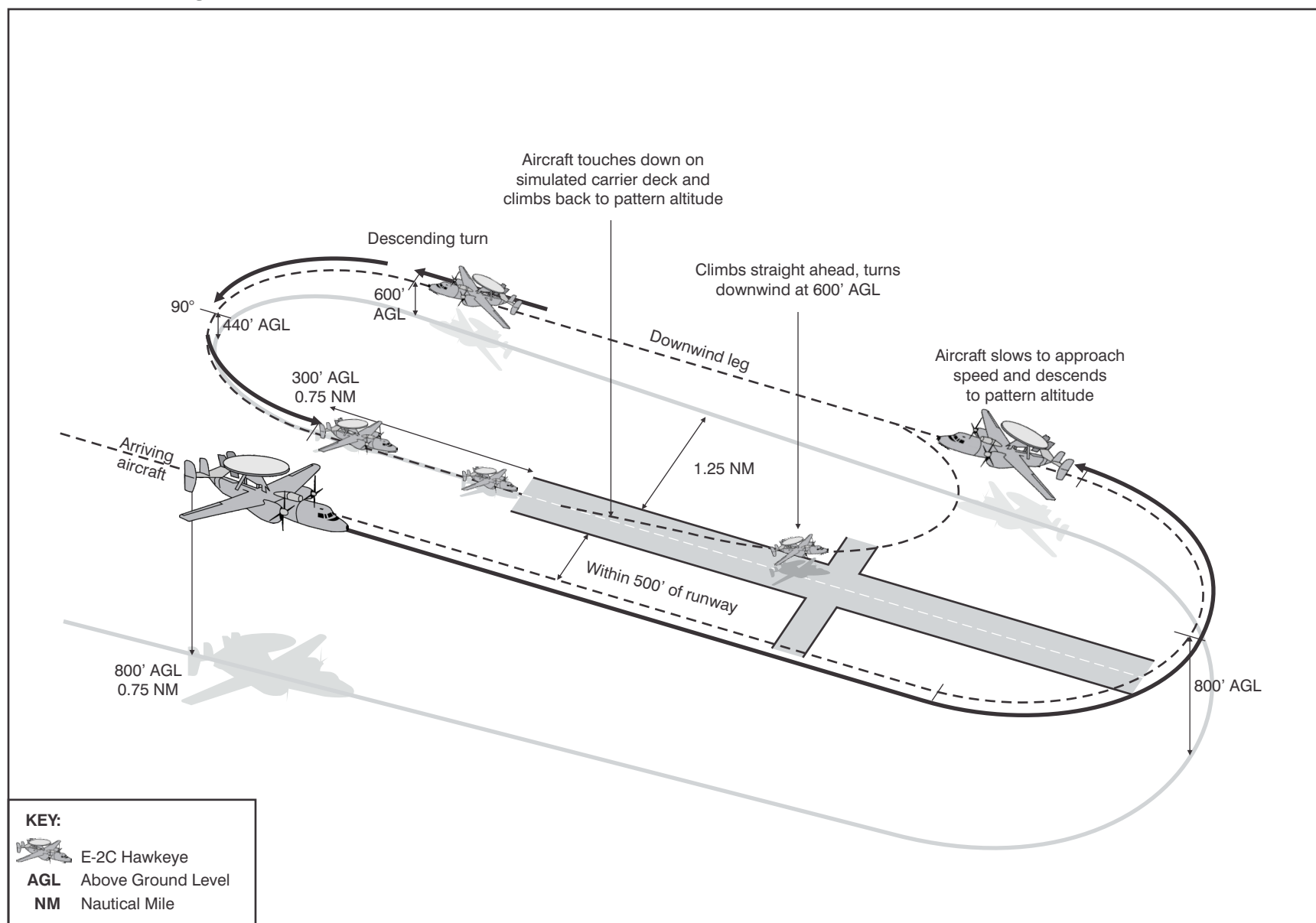


Figure 2-9 Standard Field Carrier Landing Practice (FCLP) Pattern

If NASA WFF, a federally owned airfield (see Figures 1-3 and 1-4), is chosen, the agencies would enter into an agreement for use of the airfield. The proposed term of the initial agreement would be for five years.

2.1.3 Airfield Modification Requirements

The airport modifications discussed in Section 1.2.3 are required to facilitate E-2/C-2 FCLP at Emporia-Greenville or WFF Main Base. Figures 2-10 and 2-11 show the locations of the proposed airfield modifications at Emporia-Greenville, and Figures 2-12, 2-13, 2-14, and 2-15 show the locations of proposed modifications at WFF Main Base. If WFF Main Base is selected, runway lighting would only be installed on two of the four runway ends, as only two runway ends would be utilized for nighttime E-2/C-2 FCLP operations. Proposed infrastructure locations are based upon the best information available and may be adjusted slightly as design plans are finalized; however, the overall level of impact would not be expected to change. Infrastructure changes at Emporia-Greenville must meet FAA standards and would be subject to FAA review and approval because the airport is within FAA's National Plan of Integrated Airport Systems (see Section 1.1).

2.1.4 Facility Personnel

No aircraft or squadron personnel would be permanently stationed or homebased at Emporia-Greenville or WFF Main Base. WFF Main Base's base operations and airfield facilities provide the ability for the aircraft to conduct full stop landings, allowing for on-deck refueling, crew swaps, or for the aircraft to temporarily shut down and remain at the airfield between training periods. For FCLP detachment operations at WFF, Navy personnel, aircraft, and support equipment would remain at the airfield and in the local area during the length of the detachment.

During FCLP periods at either Emporia-Greenville or WFF Main Base, Norfolk-based Navy personnel would be at the airfield to observe and grade the pilots conducting the training operations.

2.2 Description of Alternatives

The EA evaluates two alternatives for conducting E-2/C-2 FCLP operations as well as the No Action Alternative. The two alternatives include up to 45,000 annual operations (which include fleet and FRS operations) at Emporia-Greenville Regional Airport (Alternative 1) and up to 45,000 annual operations (including fleet and FRS operations) at NASA Wallops Flight Facility (Alternative 2). These two alternatives meet the purpose and need of the proposed action, as described in Section 1.2. Under the No Action Alternative, E-2/C-2 FCLP activities would continue in the manner they are currently conducted. The No Action Alternative is used as a benchmark for decision makers to compare the potential environmental effects of the proposed action and alternatives with existing baseline conditions.



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Simulated Carrier Deck and Lighting
- Concrete Pad
- Airfield Lighting Circuits
- Proposed Electrical Line
- Telephone Ductbank
- Emporia Greenville Regional Airport Boundary

Figure 2-10
Runway 15: Proposed Modifications
Emporia-Greenville Regional Airport

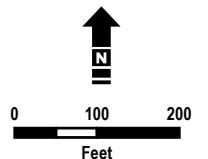
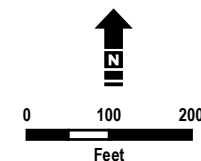
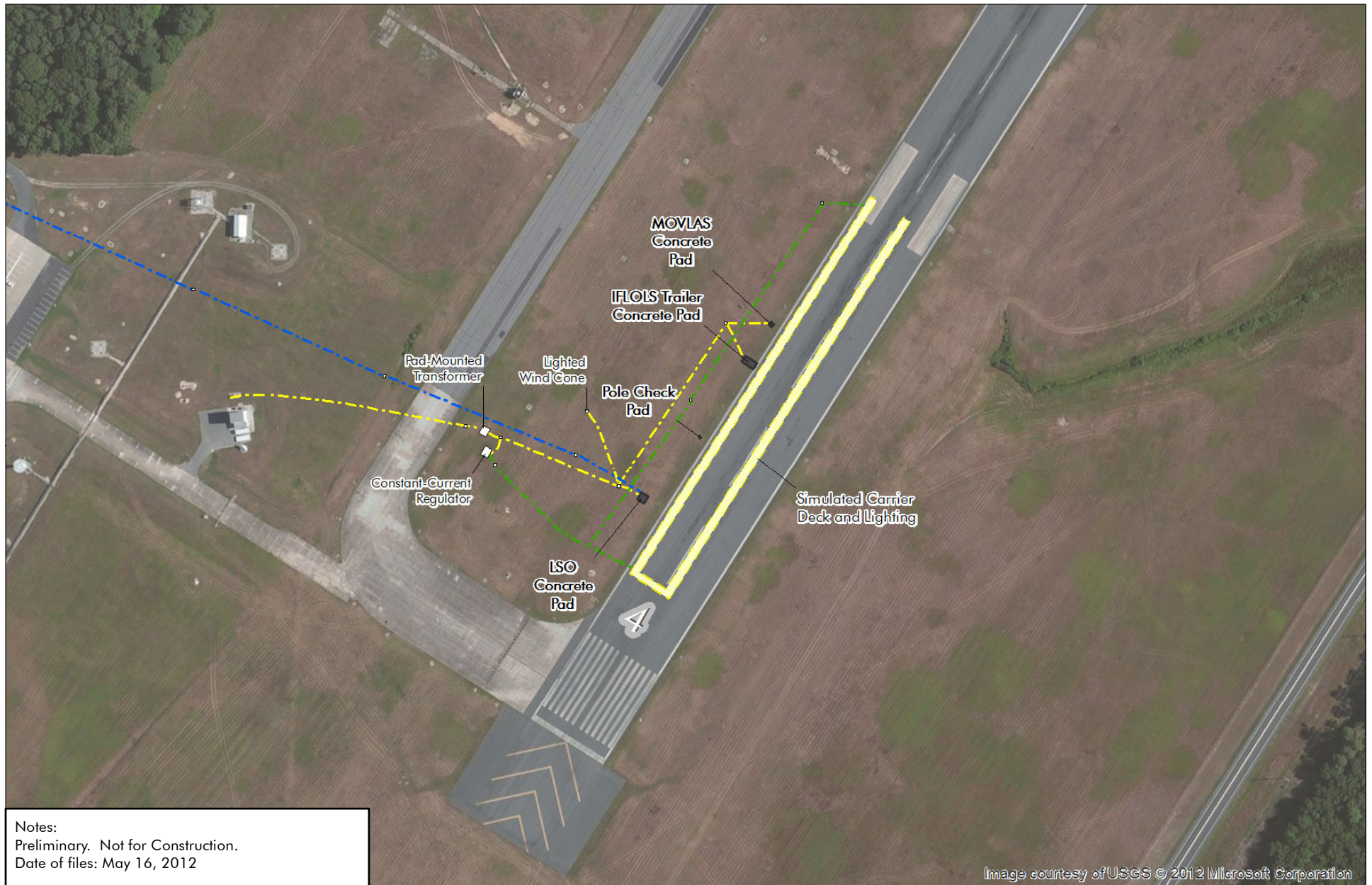




Figure 2-11
Runway 33: Proposed Modifications
Emporia-Greenville Regional Airport

- Airfield Lighting Circuits
- Proposed Electrical Line
- Proposed Telephone Line
- Concrete Pad
- Simulated Carrier Deck and Lighting
- Emporia Greenville Regional Airport Boundary

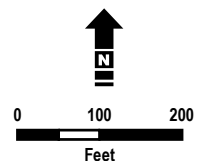


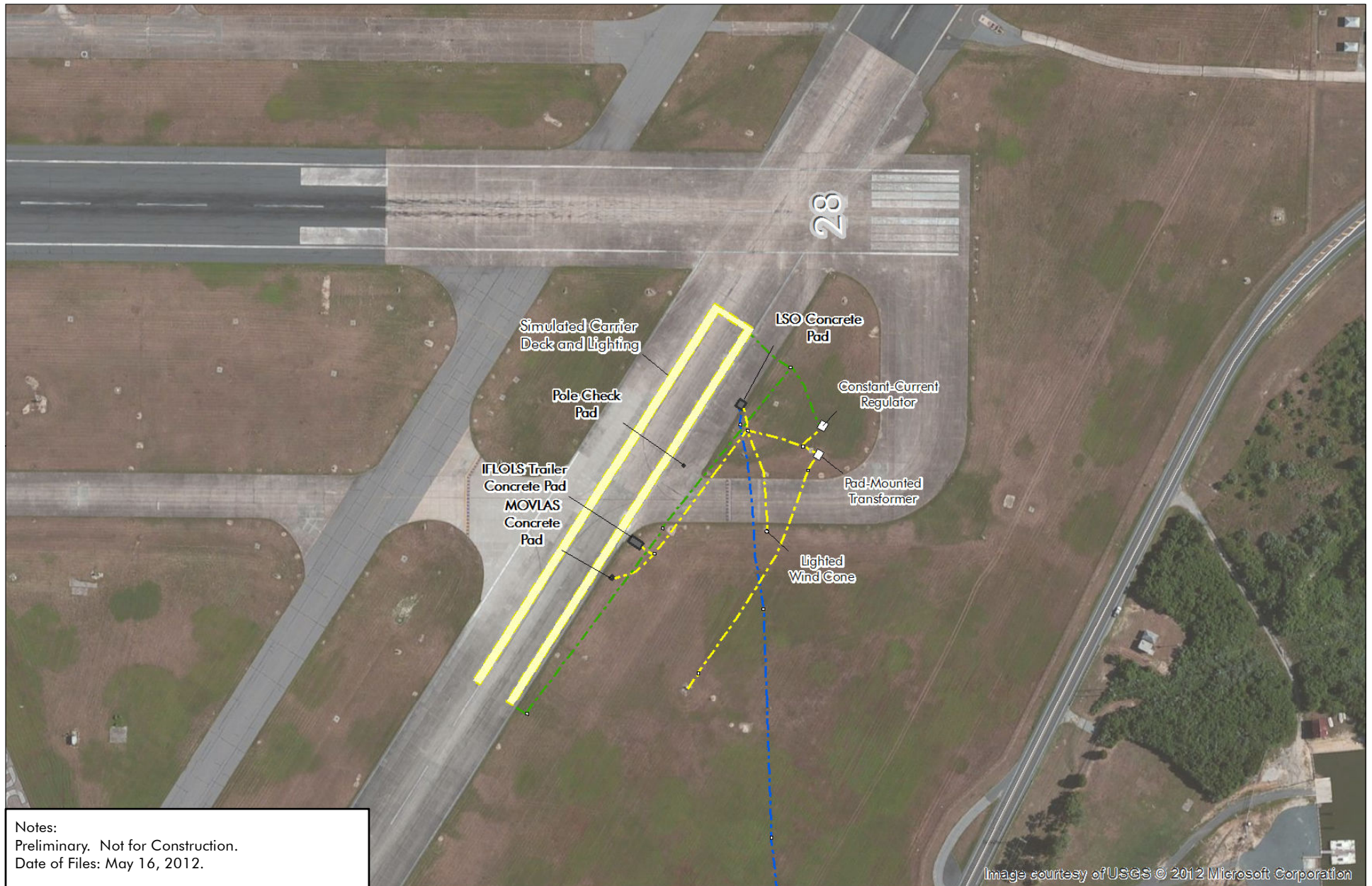


Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Airfield Lighting Circuits
- Proposed Electrical Line
- Telephone Ductbank
- Concrete Pad
- Simulated Carrier Deck and Lighting

Figure 2-12
Runway 4: Proposed Modifications
Wallops Flight Facility

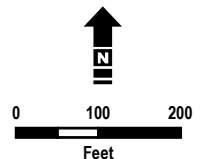




Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Airfield Lighting Circuits
- Proposed Electrical Line
- Telephone Ductbank
- Concrete Pad
- Simulated Carrier Deck and Lighting

Figure 2-13
Runway 22: Proposed Modifications
Wallops Flight Facility

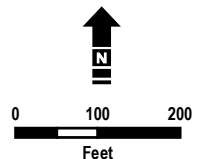


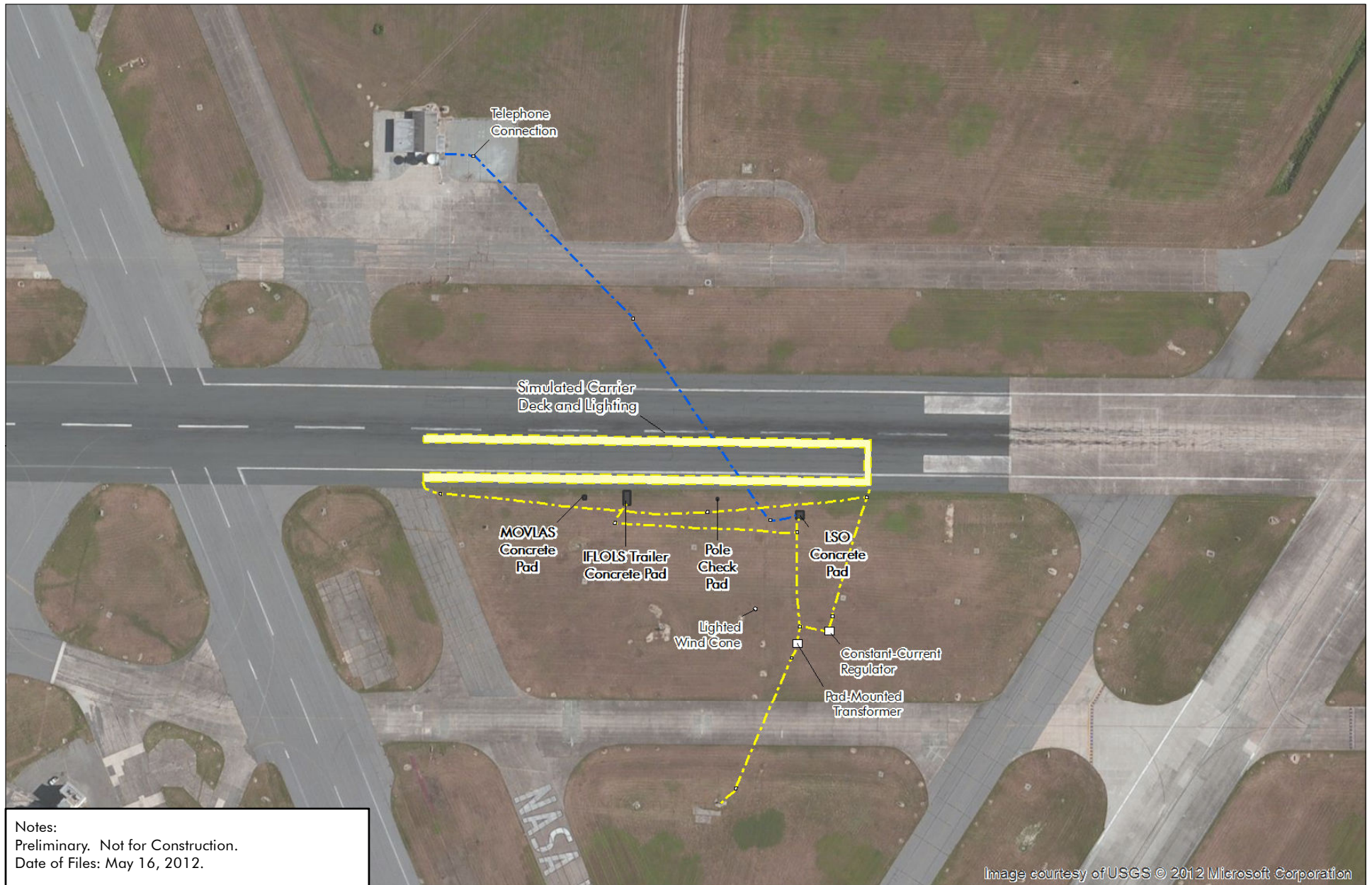


Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Airfield Lighting Circuits
- Proposed Electrical Line
- Telephone Ductbank
- Concrete Pad
- Simulated Carrier Deck and Lighting

Figure 2-14
Runway 10: Proposed Modifications
Wallops Flight Facility

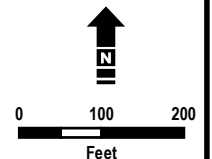




Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Concrete Pad
- Simulated Carrier Deck and Lighting
- Proposed Electrical Line
- Telephone Ductbank

Figure 2-15
Runway 28: Proposed Modifications
Wallops Flight Facility



2.2.1 Alternative 1: Emporia-Greenville Regional Airport

Under Alternative 1, the Navy would conduct up to 45,000 E-2/C-2 FCLP operations annually at Emporia-Greenville. Given the transit distance from NS Norfolk Chambers Field, there would not be a need to refuel aircraft at Emporia-Greenville during routine FCLP training operations. In addition, pilots would neither detach to Emporia-Greenville, i.e., stay overnight, nor conduct full-stop landings at the airport under normal conditions.

This alternative evaluates the impacts of two operational scenarios for Emporia-Greenville. Scenario 1 is a pattern with up to three planes.¹ This scenario would include up to 30,000 FRS E-2/C-2 operations and up to 15,000 fleet squadron operations, for a total of up to 45,000 operations. Scenario 2 would include up to 30,000 FCLP operations using a five-plane pattern and up to 15,000 FCLP operations using a three-plane pattern for a total of up to 45,000 FCLP operations. As provided in the Navy's RFPs, the Navy would prefer to operate according to Scenario 2, i.e., the three- and five-plane patterns, which would allow for greater training flexibility. Final results of the RFP process will be determined following completion of this EA.

2.2.2 Alternative 2: Wallops Flight Facility

Under Alternative 2, the Navy would conduct up to 45,000 E-2/C-2 FCLP operations annually at NASA Wallops Flight Facility. Aircraft refueling and overnight detachments could occur at NASA WFF Main Base if this alternative is chosen.

This alternative evaluates a combination of three- and five-plane patterns, where up to 30,000 FCLP operations are conducted using a five-plane pattern and up to 15,000 FCLP operations are conducted using a three-plane pattern for a total of up to 45,000 FCLP operations. There are also two scenarios analyzed under this alternative: Scenario 1 would include use of Runway 04/22, while Scenario 2 would include use of Runway 10/28.

As noted in Section 2.1.1.1, two of the four runway ends at WFF would be utilized for E-2/C-2 FCLP operations if operations would be conducted during the day and at night (i.e., under either Scenario 1 or Scenario 2); however, daytime-only FCLP operations could be conducted on up to four runway ends. "Night" is defined as flying after sunset and, at times during the year, could begin as early as 5:30 p.m. This option (conduct daytime operations on four runway ends) is covered under the analysis for Scenarios 1 and 2 for WFF since noise contours and flight tracks for this option would fall within those modeled for these two scenarios.

¹ The scenarios described in this EA are labeled differently in the Noise Analysis (BRRC 2012). For Emporia-Greenville, Scenario 1 in this EA corresponds with Alternative 1A in the Noise Analysis, and Scenario 2 in this EA corresponds with Alternative 1B in the Noise Analysis. For WFF, Scenario 1 in this EA corresponds with Alternative 2B in the Noise Analysis, and Scenario 2 in this EA corresponds with Alternative 2D in the Noise Analysis.

2.2.3 No Action Alternative

Pursuant to 40 CFR 1502.14(d), the No Action Alternative is evaluated in this EA. The No Action Alternative may serve as a benchmark for decision makers to compare the potential environmental effects of the proposed action and alternatives with existing baseline conditions.

Under the No Action Alternative, the Navy would not use the airfield facilities at Emporia-Greenville or WFF Main Base for E-2/C-2 FCLP. E-2/C-2 squadrons, operating from NS Norfolk Chambers Field, would continue to utilize NALF Fentress as the primary local airfield for E-2/C-2 FCLP training requirements supplemented by occasional FCLP training at alternative airfields such as NAS Oceana and by conducting detachments outside the local area when NALF Fentress scheduling reaches maximum capacity.

2.3 Alternatives Eliminated from Further Consideration

Because of the unique nature of FCLP and the specific airfield requirements necessary to conduct FCLP, only airfields meeting the proximity, technical requirements, and technical evaluation factors outlined in Section 1.2.3 were considered as alternatives in this EA. Eliminated from consideration were any airports expressing interest but not meeting the technical airfield requirements.

From April 2010 through August 2010, the Navy conducted a survey of local public and private civilian airfields potentially suitable to support near term, interim E-2/C-2 FCLP operations within 90 nautical miles of NS Norfolk Chambers Field. Ninety nautical miles represents the maximum distance an E-2/C-2 aircraft can transit to an airfield from NS Norfolk Chambers Field, conduct a three-hour FCLP session, and return with a required fuel reserve under visual flight rules without refueling en route. This distance criterion was initially selected to provide for the largest geographical range in identifying potentially suitable airfields. Results of that survey can be found in the August 2010 *Report on the Results of the Market Survey of Prospective Public Airfields to Determine Ability to Support Field Carrier Landing Practice (FCLP) Operations for E-2/C-2 Squadrons* (NAVFAC 2010). The market survey was initiated as a precursor to a planned procurement process, which would include development and release of a formal RFP for an airfield use agreement.

Prior to initiating the market survey process, the Navy developed the following set of preliminary minimum mission requirements for an airfield to support E-2/C-2 FCLP training:

- (1) Proposed airfield must be within a maximum aircraft transit distance of 90 nautical miles from NS Norfolk Chambers Field;
- (2) The minimum runway length must be 5,000 feet (rounded to the nearest 100 feet), which represents the minimum runway length for an E-2/C-2 to complete a takeoff or full-stop landing under normal procedures; and
- (3) The minimum runway width must be 100 feet, which is the minimum width necessary to support the C-2 aircraft wingspan of approximately 80 feet.

Reviewing available airfield data, the Navy identified 16 airfields within Virginia and North Carolina that met the three minimum operational requirements. Managers of each of the 16 airfields were sent a letter of inquiry to determine their interest in being considered during the competitive procurement process. The following seven airfields, all located in Virginia, expressed interest:

- Accomack County Airport
- Chesapeake Regional Airport
- Chesterfield County Airport
- Dinwiddie County Airport
- Emporia-Greensville Regional Airport
- Franklin Municipal Airport
- Suffolk Executive Airport

The Navy responded to each interested airfield manager with a questionnaire to collect more specific information while ensuring that the same information was collected on all seven airfields. A review of the completed questionnaires verified that each airfield met the minimum three original operational requirements for an airfield to support E-2/C-2 FCLP training and could be considered a viable alternative.

In conjunction with the questionnaire, the Navy conducted site visits between June 24 and July 26, 2010 to the seven airfields that expressed interest. Based on data collected during the site visits, the Navy determined that several characteristics were preferable in an airfield that would support E-2/C-2 FCLP training: low annual flight operations; unrestricted airspace to conduct FCLP operations from either end of the runway based on prevailing wind conditions; a convenient aircraft transit route under visual flight rules from NS Norfolk Chambers Field; and surrounding land uses that are compatible with FCLP operations and have low population densities. Areas with higher population densities typically require modifications to the regular FCLP pattern and have extraneous lights and other visible reference points that could degrade the realism of nighttime training (NAVFAC 2010).

In February 2011, the Navy released a RFP “To Procure Use of a Non-DOD Airfield to Support Field Carrier Landing Practice (FCLP) by E-2/C-2 Squadrons Homebased at or Transient to Naval Station Norfolk Chambers Field.” As part of this procurement process, selection boards met to review the proposals received. This project is still an active procurement; therefore, further information about the competitive process is considered source selection-sensitive and cannot be released. The sensitive information includes which airfields submitted offers and the Navy’s evaluation of those offers. The only public airfield analyzed in this EA is Emporia-Greensville Regional Airport.

3

Existing Environment and Environmental Impacts

This chapter provides a description of the existing environment that could be affected by the proposed action at Emporia-Greenville Regional Airport or WFF, and the potential environmental impacts of the proposed action. As directed by NEPA, CEQ regulations on implementing NEPA (40 CFR 1500-1508), Navy procedures for implementing NEPA (32 CFR 775), and Navy environmental instructions (OPNAVINST 5090.1C CH-1), the description of the affected environment focuses on those resource areas potentially subject to impacts. Therefore, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

Two of the resource areas presented in this chapter—Noise and Land Use (Sections 3.5 and 3.6)—provide discussion of impacts under each alternative by Scenario (see Section 2.2 for explanation of scenarios). Only these two resource areas break out analysis by scenario because they were the only two that were found to have a discernible difference in impacts between the two scenarios.

As discussed in Section 3.1, certain resource areas have been eliminated from consideration in this EA because they are not expected to be impacted by the proposed action. The environmental resources potentially affected by the proposed action and evaluated in this EA are listed in Section 1.3 and are analyzed in Sections 3.2 through 3.14.

3.1 Resources Considered but Not Evaluated in Detail

The following resource areas are not expected to be impacted by the proposed action and therefore were not analyzed as part of this EA:

Transportation

Under the proposed action, the Navy would not permanently station or homebase any aircraft or personnel at either Emporia-Greenville or WFF Main Base. During times when the Navy would be conducting operations at either facility, minimal Navy personnel would arrive from NS Norfolk Chambers Field to observe and grade the pilots conducting training operations. Both facilities are located along well-maintained two-lane or four-lane roads, and the addition of two to three vehicles would not impact the local roadway level of service or traffic patterns.

In a detachment situation at WFF Main Base, personnel, aircraft, and support equipment may remain in the local area during the training period. This would represent up to 27 additional vehicles on local roads during the training periods. Given the low number of vehicles and the fact that their presence would be on an infrequent and temporary basis, this would not impact the local roadway level of service or traffic patterns. Traffic and transportation analyses, therefore, are not included in this EA for either Emporia-Greenville or WFF Main Base.

Wild and Scenic Rivers

There are no federally designated wild or scenic rivers in Virginia (National Wild and Scenic Rivers System 2011). The closest state-designated scenic river to Emporia-Greenville is the Meherrin River in Brunswick County, approximately 9 miles west of Emporia-Greenville (VDCR NHP 2010). There are no state-designated scenic rivers within the immediate vicinity of WFF Main Base (VDCR NHP 2010). As a result, wild and scenic rivers are not analyzed in this EA for either Emporia-Greenville or WFF Main Base.

Department of Transportation: Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 (recodified in 1983 to 49 U.S.C. 303) was implemented in an effort to preserve the natural beauty of the countryside and public and recreational lands, wildlife and waterfowl refuges, and historic sites. The FAA is a cooperating agency for this EA and one of several organizations within the DOT. As there are no public and recreational lands, wildlife and waterfowl refuges, and historic sites within the study area (i.e., within the noise contours) for Emporia-Greenville, an analysis of Section 4(f) is not required. As WFF is a federal facility, Section 4(f) does not apply; therefore, Section 4(f) will not be formally analyzed for WFF Main Base.

3.2 Aircraft Operations and Airspace

Airspace is the three-dimensional space above Earth's surface. This finite resource is managed by the FAA and other designated agencies, such as the DOD, for the benefit and use of all aviation sectors needing access to it, including commercial, general, and military (Interagency Aviation Management Council 2003). FAA-designated controlled airspace is divided into five classes, A through E, as shown and described in Figure 3-1. These classes identify airspace that supports airport operations and designated airways affording transit from place to place.

3.2.1 Existing Aircraft Operations and Airspace at Emporia-Greenville Regional Airport

The study area for this section is the airfield at Emporia-Greenville and the extent of the holding pattern flight track (see Section 2.1 for a description and figure of the holding area flight track).

3.2.1.1 Aircraft Operations

Emporia-Greenville is predominantly located in Greenville County, with a small portion of the southern end of the runway and airport property extending into Southampton County. It is located 1.4 miles east of the City of Emporia.

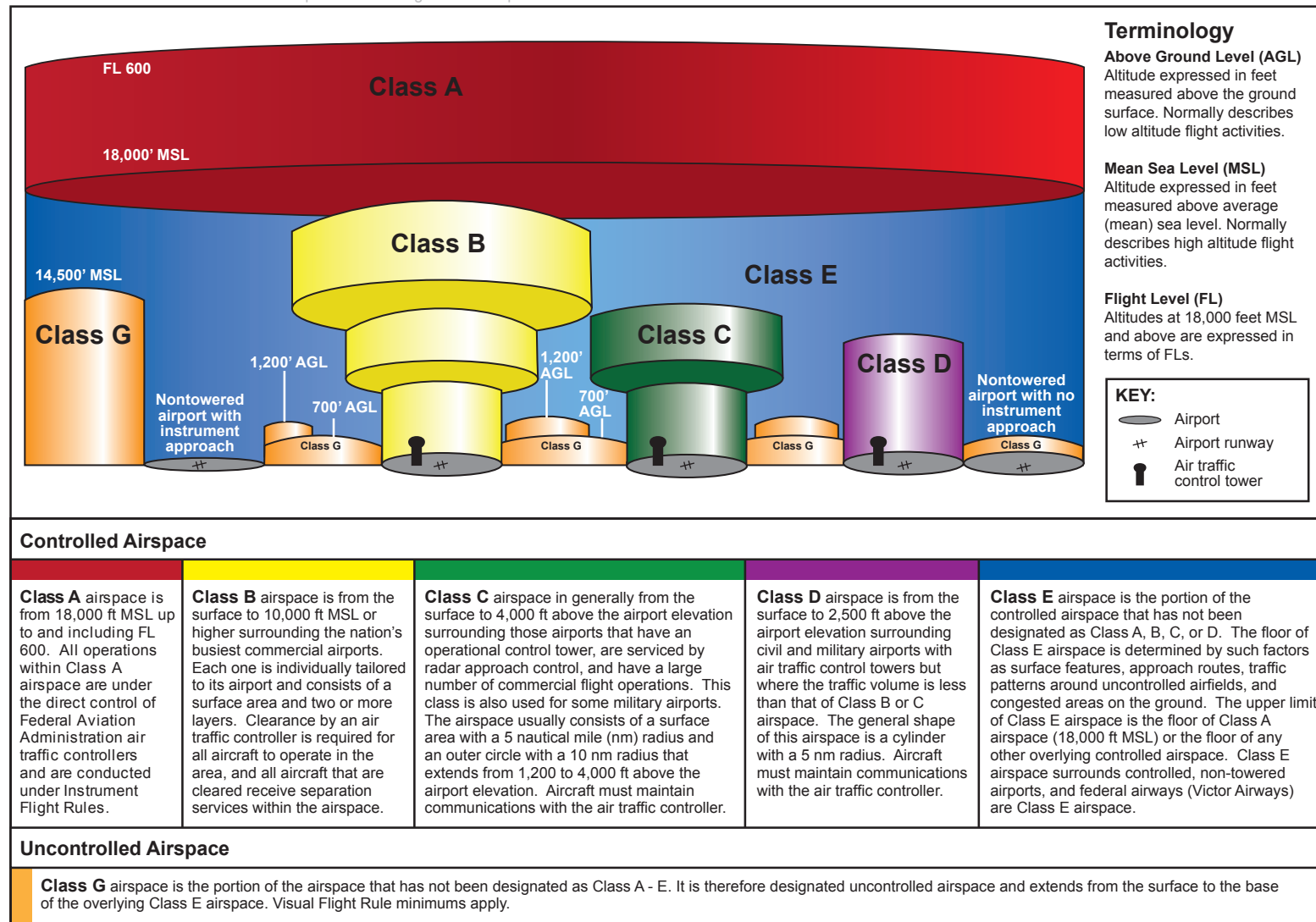


Figure 3-1 Airspace Classes

Emporia-Greenville has a total of three Instrument Approach Procedures, which are designed to allow aircraft to safely land at the airfield when meteorological conditions do not allow for visual approaches. Runways 15 and 33 can support Global Positioning System (GPS) approaches, and Runway 33 has a localizer, which is an antennae array transmitting a signal that provides lateral guidance to aircraft approaching the runway.

A “flight operation” refers to any instance in which an aircraft crosses over the runway threshold at an airfield. Departures and arrivals each count as one operation. Based upon information received from Emporia-Greenville and the FAA, approximately 1,180 fixed-wing aircraft operations occur at the airport annually. This would equate to approximately three fixed-wing operations per day, the majority of which are conducted with civilian propeller-driven aircraft. In addition, approximately 1,140 military helicopter operations are estimated to occur annually (Table 3-1).

Instrument Flight Rules.

Rules governing the procedures for flying by reference to instruments on the flight deck, with navigation accomplished by reference to electronic signals. Instrument flight rules require pilots to be trained and certified in navigational methodologies and to adhere to air traffic control clearances regarding specific flight route and altitude directions.

Visual Flight Rules. Rules governing the procedures for conducting flight with visual reference to the ground and by visually avoiding obstructions and other aircraft. Visual Flight Rules employ see and avoid procedures when weather conditions are clear.

Table 3-1 Summary of Existing Annual Aircraft Operations at Emporia-Greenville Regional Airport

	Civilian	Military	Total	Percent of Total
Civilian Propeller Aircraft				
Single-engine (Cessna 172)	972	-	972	41.9
Twin-engine (Beechcraft King Air 90)	92	-	92	3.9
Military Propeller Aircraft (CASA 212)	-	36	36	1.6
Jet Aircraft (Lear 35)	80	-	80	3.4
Helicopters (CH-47, MH-53)	-	1,140	1,140	49.1
Total	1,144	1,176	2,320	100

Source: BRRC 2012

**Cessna 172****Beechcraft King Air****Lear Jet****CASA-212****CH-47 Chinook****MH-53E Sea Dragon**

3.2.1.1.1 Types of Aircraft

Fixed-wing

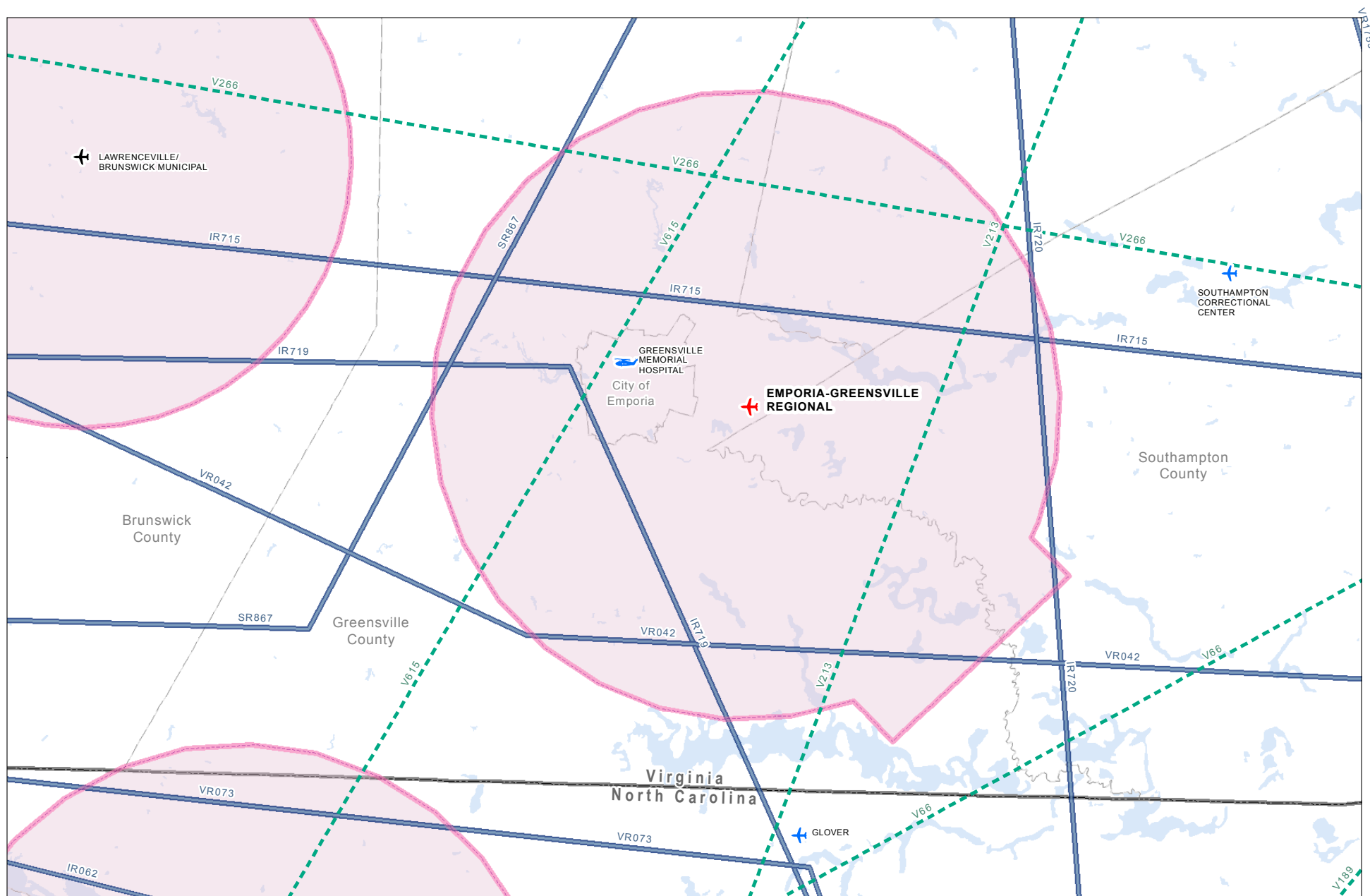
A fixed-wing aircraft is an aircraft whose lift is generated by the forward motion of its wings through the air. Common types of civilian fixed-wing aircraft that typically use Emporia-Greenville include single-engine propeller aircraft such as the Cessna 172, twin-engine propeller aircraft such as the Beechcraft King Air 90, and business jets like the Lear 35 and the Cessna Citation. The military's CASA 212, a twin-engine propeller aircraft, also occasionally uses the airport for paratrooper training. When operating at Emporia-Greenville, these fixed-wing aircraft are performing arrivals, departures, and touch-and-go patterns.

Rotary-wing

A rotary-wing aircraft / helicopter is an aircraft that is partly or wholly sustained in the air by lifting surfaces (rotors) revolving around a vertical axis. The military occasionally performs rotary-wing operations at Emporia-Greenville and surrounding public airports using the Army's CH-47 Chinook and the Navy's MH-53E Sea Dragon helicopters. Neither aircraft is permanently based at Emporia-Greenville; however, both are used at the airport to conduct training. The Army uses the CH-47 to conduct paratrooper training, and the Navy trains in use of night-vision devices with the MH-53E.

3.2.1.2 Airspace

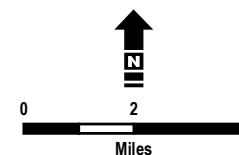
For the purposes of this EA, the airspace that would be utilized, and is evaluated as part of the Navy's proposed action, is the area immediately around Emporia-Greenville. Class E airspace surrounds Emporia-Greenville, and air traffic in proximity to Emporia-Greenville is mainly associated with transient instrument flight rule and visual flight rule overflights. To view the location of these airspace class designations in the vicinity of the airport, refer to Figure 3-2.



Source: ESRI 2010; Bureau of Transportation Statistics (BTS), 2008.

- | | |
|---------------------------------------|--------------------------|
| ✈ Emporia-Greenville Regional Airport | Airspace Class |
| ✈ Private Airport | Class E |
| ✈ Public Airport | Military Training Routes |
| ✈ Private Heliport | County Boundary |
| — Victor Airway Centerline | State Boundary |

Figure 3-2
**Airspace Surrounding Emporia-Greenville
 Regional Airport**
 Emporia-Greenville Regional Airport



3.2.2 Impacts on Aircraft Operations and Airspace at Emporia-Greensville Regional Airport

3.2.2.1 Impacts on Aircraft Operations at Emporia-Greensville Regional Airport

Under Alternative 1, Emporia-Greensville would be used to support FCLP training requirements for aircraft operating from NS Norfolk Chambers Field. For this analysis, these aircraft operations are divided between flight routes (the path by which the Navy E-2/C-2 aircraft transit between NS Norfolk Chambers Field and Emporia-Greensville) and flight tracks (the path flown at the airfield during FCLP). These are presented on Figure 3-3, and for a comprehensive discussion of these aircraft operations and the way in which FCLP would be scheduled and conducted, refer to Section 2.1.1.

Under this alternative, the runway would be closed to non-FCLP arrivals and departures, except in the case of an emergency. The Navy's FCLP schedule will be communicated to the airfield and aviators in advance through the use of a NOTAM, which is a standard practice. The airfield UNICOM frequency will also be monitored continuously during FCLP operations. There would be temporary impacts on existing general aviation and military aviation operations at Emporia-Greensville, as aircraft associated with both would not be able to utilize the runway during Navy FCLP operations. Although the Navy would require 24-hour-per-day, seven-day-per-week capability, the airfield would not be used all day or every day. Training would generally be scheduled Monday through Friday in three-hour periods. Aircraft based at or intending to utilize Emporia-Greensville will need to adhere to the operations guidance/limitations provided in the NOTAM. FCLP operations will be suspended at Emporia-Greensville whenever necessary to allow for emergency landings at the airfield. The Navy discussed the NOTAM process with the Emporia-Greensville staff and concluded that the airport staff will communicate and coordinate the NOTAM information with the airport tenants. The Navy did not receive any comments on this notification process at either the meeting with the airport staff or meeting with the public. As such, the Navy has concluded that there would be no significant impact on aircraft operations and/or airspace at Emporia-Greensville under Alternative 1.

3.2.2.2 Impacts on Airspace at Emporia-Greensville Regional Airport

As discussed in Section 3.2.1.2, Class E airspace currently surrounds Emporia-Greensville, and it would remain Class E airspace under the proposed action. No airspace designations would change as a result of the Navy's proposed action. Overall, there would be no significant impact to airspace use on the Emporia-Greensville airfield under Alternative 1.

 Emporia-Greenville Regional Airport  Interfacility Flight Track
 Private Airport  Military Training Routes
 Public Airport **Airspace Class**
 Private Heliport  Class E
 Victor Airway Centerline  County Boundary
  State Boundary

A number line is shown with tick marks at 0, 2, and 4. The word "Miles" is written below the line. Above the tick mark at 2 is a north arrow pointing upwards, labeled with the letter "N".

3.2.3 Existing Aircraft Operations and Airspace at Wallops Flight Facility

The study area for aircraft operations and airspace at WFF Main Base is the extent of the holding area flight track (see Section 2.1 for a description and figure of the holding pattern flight track).

3.2.3.1 Aircraft Operations

WFF Main Base is owned and operated by NASA. The facility has three runways, identified as Runway 4/22, Runway 10/28, and Runway 17/35. Runway 4/22 is 8,750 feet long and 150 feet wide, Runway 10/28 is 8,000 feet long and 150 feet wide, and Runway 17/35 is 4,820 feet long and 110 feet wide (Note: since Runway 17/35 does not meet the Navy's length requirement of 5,000 feet, it is not being examined for potential Navy use in this EA). The airport has a control tower. It is a private-use airport and is not part of the FAA's National Plan of Integrated Airport Systems. A total of up to 11 aircraft are based at the airport: 10 fixed-wing aircraft (seven multi-engine aircraft, one single engine aircraft, and two jet aircraft) and one rotary-wing aircraft (NASA Wallops Flight Facility Aircraft Office 2012).

WFF Main Base has a total of five instrument approach procedures, which are designed to allow aircraft to safely land at the airfield when meteorological conditions do not allow for visual approaches. Runways 04, 10, 17, 22, and 28 can support GPS approaches for aircraft with global positioning systems.

Based upon information received from NASA, approximately 13,074 aircraft operations (both fixed-wing and rotary-wing) occurred at the airfield in 2011 (Table 3-2). This would equate to approximately 36 operations per day. Section 3.2.3.1.1 discusses the types of aircraft that regularly utilize WFF Main Base.

Table 3-2 Summary of Existing Annual Aircraft Operations at Wallops Flight Facility Main Base (2011)

	Civilian	Military	Total	Percent of Total
NASA (P-3, Super King Air)	313	-	313	2.4
U.S. Navy (FA-18, E-2/C-2)	-	11,050	11,050	84.5
Air National Guard (A-10 MD ANG)	-	772	772	5.9
U.S. Coast Guard (C-130, H-60)	-	32	32	0.2
U.S. Air Force (C-40)	-	670	670	5.1
U.S. Army (UH-60)	-	49	49	0.4
Misc.	188	-	188	1.4
Total	501	12,573	13,074	100

Source: BRRC 2012

**P-3 Orion****Beechcraft Super King****FA-18F Super Hornet****C-40 Clipper****A-10 Thunderbolt II****C-130 Hercules****UH-60 Blackhawk**

3.2.3.1.1 Types of Aircraft

Fixed-wing

Common types of fixed-wing aircraft that typically use WFF Main Base include the P-3 Orion and Beechcraft Super King Air (operated by NASA); the FA-18 jet aircraft, E-2/C-2 twin-engine, turboprop aircraft (operated by the Navy); the A-10 (operated by the Maryland Air National Guard); the C-130 (operated by the U.S. Coast Guard); and the C-40 (operated by the U.S. Air Force). When operating at WFF Main Base, these fixed-wing aircraft are performing arrivals, departures, and touch-and-go patterns.

Rotary-wing

Common types of rotary-wing aircraft at WFF Main Base include multiple variants of H-60 helicopters operated by the U.S. Coast Guard, Navy, and Army.

3.2.3.2 Airspace

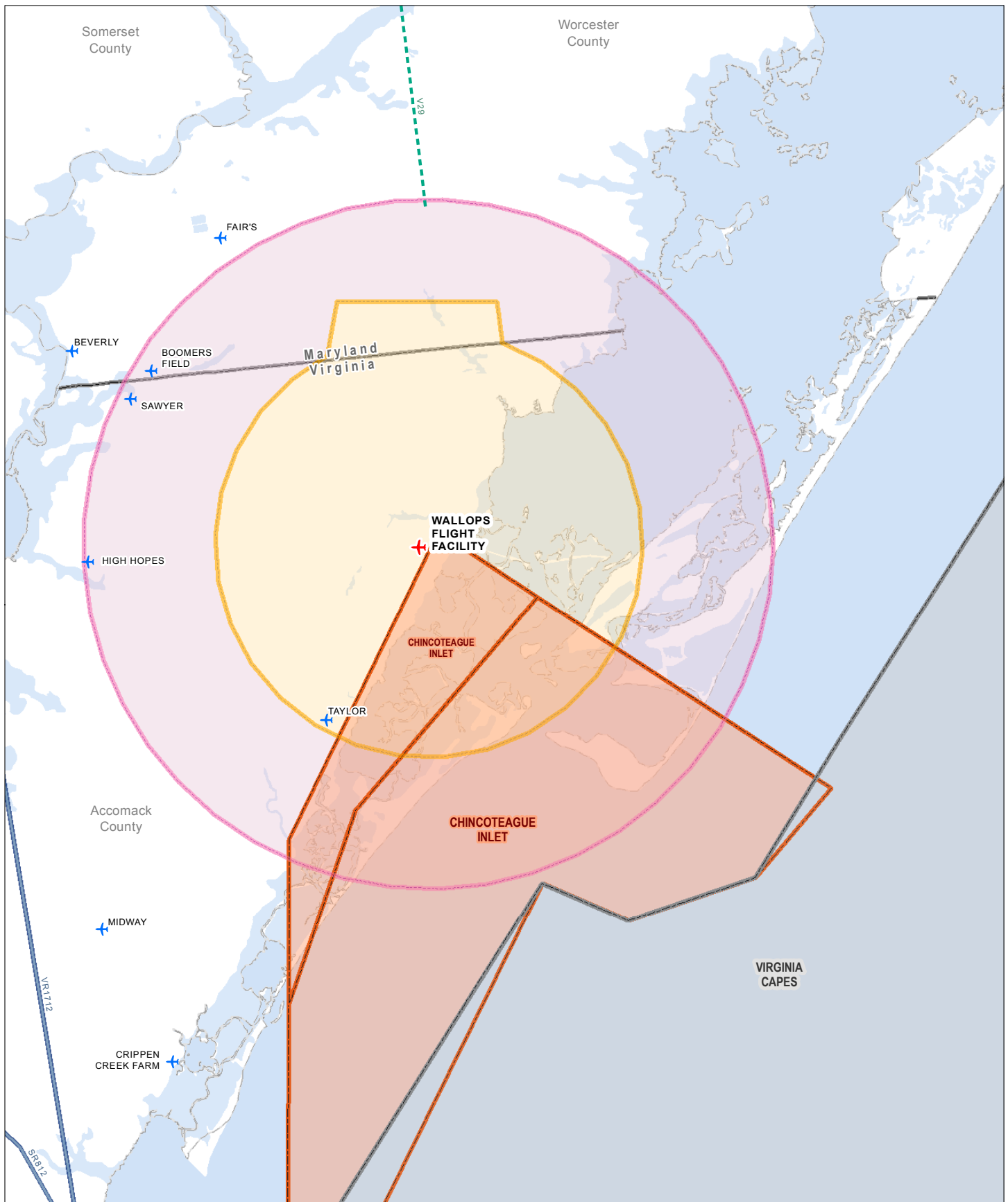
Airspace surrounding WFF Main Base is shown in Figure 3-4. FAA-designated controlled airspace is divided into five classes, A through E, as shown and described in Figure 3-1. These classes identify airspace that supports airport operations and designated airways affording transit from place to place. WFF Main Base has both Class D and E designations surrounding the airfield. To view the location of these airspace class designations in the vicinity of the airport, refer to Figure 3-4.

3.2.4 Impacts on Aircraft Operations and Airspace at Wallops Flight Facility

Current air traffic in the vicinity of WFF Main Base is associated with NASA flights and military flights (primarily Navy from NAS Patuxent River and NS Norfolk). No victor airways or military training routes are within WFF Main Base's Class D or E airspace. One private airfield (Taylor) is located within the existing Class D airspace surrounding WFF Main Base and three private airfields (Boomers Field, Sawyer, and High Hopes) are located within the existing Class E airspace.

3.2.4.1 Impacts on Aircraft Operations

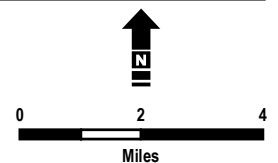
Under Alternative 2, WFF Main Base would be used to support FCLP training requirements for aircraft operating from NS Norfolk Chambers Field. For this analysis, these aircraft operations are divided between flight routes (the path by which the Navy E-2/C-2 aircraft transit between NS Norfolk Chambers Field and WFF Main Base) and flight tracks (the path flown at the airfield during FCLP). These are presented on Figure 3-5; for a comprehensive discussion of these aircraft operations and the way in which FCLP would be scheduled and conducted, refer to Section 2.1.1.

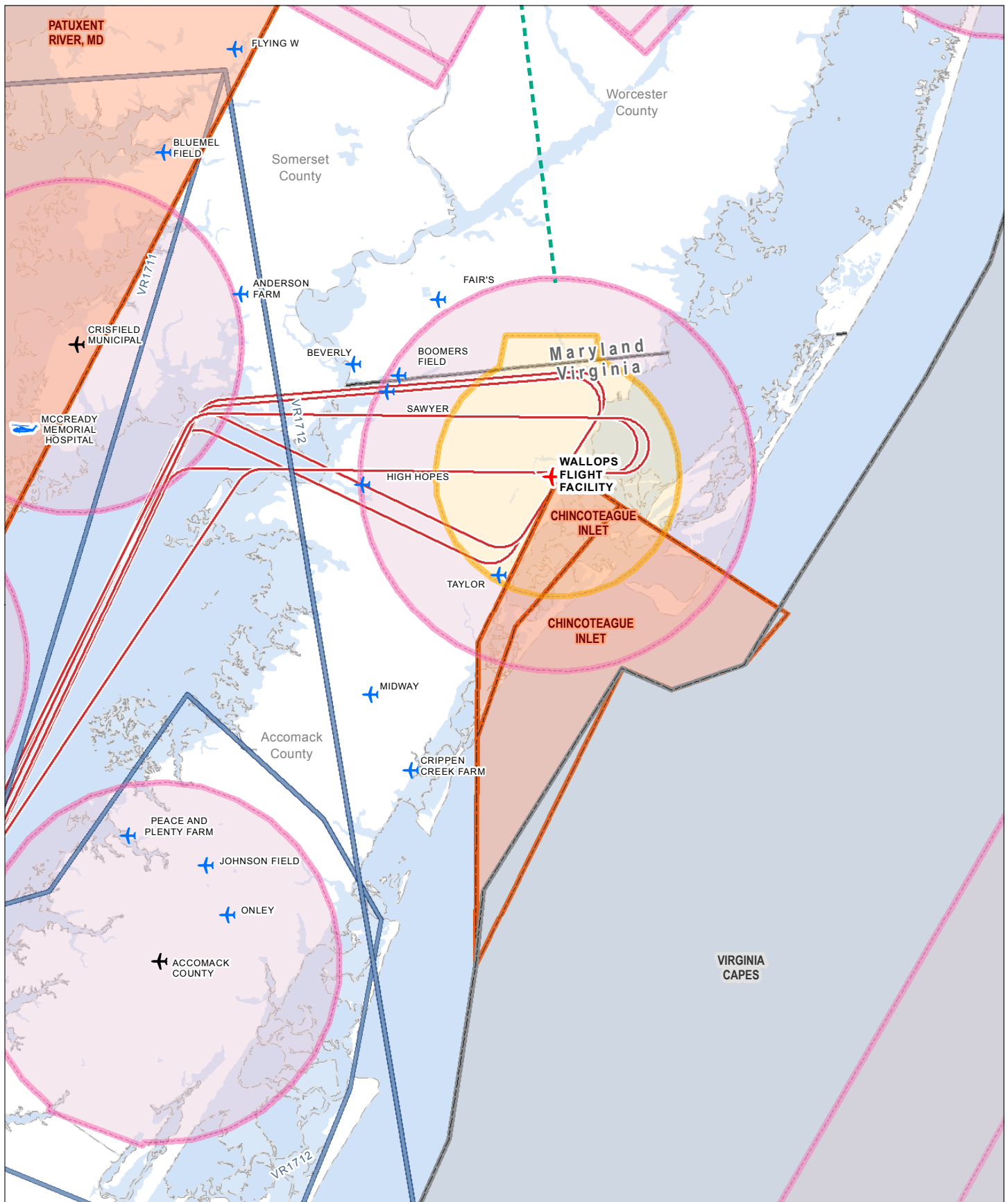


Source: ESRI 2010; Bureau of Transportation Statistics (BTS), 2008.

- | | | |
|----------------------------|---|--|
| ✚ Wallops Flight Facility | Airspace Class Class D | Special Use Airspace Warning Area |
| ✚ Private Airport | Airspace Class Class E | Restricted Airspace |
| — Victor Airway Centerline | | — County Boundary |
| — Military Training Routes | | — State Boundary |

Figure 3-4
**Airspace Surrounding
 Wallops Flight Facility**





Source: ESRI 2010; Bureau of Transportation Statistics (BTS), 2008.

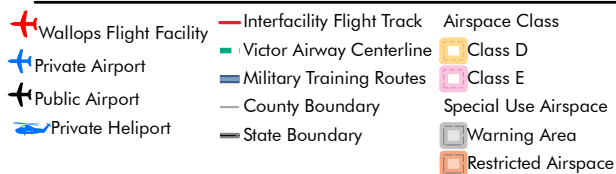
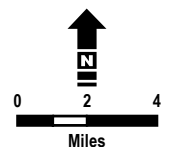


Figure 3-5
**Airspace and
Flight Tracks**
Wallops Flight Facility



Under this alternative, the FCLP runway would generally be closed to non-FCLP aircraft, and airspace surrounding WFF would be closed to civilian operations. Exceptions would be to facilitate the handling of emergency aircraft or, if necessary, to de-conflict with other airfield missions. The Navy will coordinate in advance with WFF Main Base on the FCLP schedule as provided in the interagency agreement. As such, there would be no significant impact on civilian aircraft use of the airspace or on aircraft operations at WFF under Alternative 2.

If WFF Main Base is chosen, the Navy could conduct full-stop landings and could refuel and conduct detachments, as needed. Although the Navy would require 24-hour-per-day, seven-day-per-week capability, the airfield would not be used all day or every day. Training would generally be scheduled Monday through Friday in three-hour periods.

3.2.4.2 Impacts on Airspace

As discussed in Section 3.2.1.2, Class D and E airspace currently surrounds WFF Main Base. This would remain unchanged under the proposed action. Overall, there would be no significant airspace impact on WFF under Alternative 2.

3.3 Safety

Safety addresses flight safety (to specifically include bird/animal aircraft strike hazard [BASH]) and runway design.

3.3.1 Flight Safety

There is no universally recognized threshold that defines acceptable or unacceptable flight safety conditions. The objective is to manage and reduce flight risks through a number of measures, including, but not limited to, providing and disseminating pertinent and timely information to airspace users, requiring appropriate levels of training for airspace users, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of airspace. When these safety measures are implemented, risks are reduced.

To that end, the FAA is responsible for ensuring the safe and efficient use of U.S. airspace through the establishment of safety regulations, airfield design, airspace and airfield management guidelines, a common civil-military airspace system, and cooperative activities with the DOD. These actions reduce the risks of aviation mishaps occurring as a result of aircrew or controller error, aircraft collisions with other aircraft or wildlife, equipment and/or mechanical failures, or inclement weather conditions.

The DOD defines aviation mishaps (i.e., accidents) as events that result in illness or injury to military or civilian personnel and/or damage to DOD, public, or private property (Bolkcom 2002). The DOD classifies aviation mishaps based on the extent of property damage and/or injury they cause. Mishap rates are calculated per 100,000 flying hours, excluding combat hours, and for the Navy,

are further segregated as ashore or at sea. A Class A mishap is one that results in loss of life or permanent disability, destruction of the aircraft, or property damage totaling \$2 million or greater. For ashore operations, the E-2 has a historical (31 years) Class A mishap rate of 1.14 mishaps per 100,000 hours, and the C-2 has a historical (31 years) Class A mishap rate of 1.01 mishaps per 100,000 hours (Naval Safety Center 2012).

3.3.1.1 Bird/Animal Aircraft Strike Hazard

An aircraft collision with birds or other wildlife, referred to as “bird/animal aircraft strike hazard,” or BASH, is a critical safety concern for both civilian and military aviation. To reduce the potential for wildlife strikes, BASH management plans are developed and tailored to each individual airport, depending on specific wildlife concerns. The United States Department of Agriculture (USDA), Animal Plant and Health Inspection Service, Wildlife Services division (Wildlife Services), employs wildlife biologists to manage and control bird and animal hazards to aviation. These professionals are hired by commercial and non-commercial airports to manage BASH risk. Wildlife Services staff implement techniques identified in the BASH management plan.

From 1991 through 2011, a total of 1,445 bird and wildlife strikes were recorded throughout Virginia (FAA n.d.[a]). Gulls, the mourning dove (*Zenaida macroura*), the Canada goose (*Branta canadensis*), sparrows, the European starling (*Sturnus vulgaris*), and the eastern meadowlark (*Sturnella magna*) are among the most commonly recorded bird species and bird species groups struck in Virginia. The white-tailed deer (*Odocoileus virginianus*) is the most commonly struck mammal, with 42 strikes reported in Virginia in the past 20 years. Other mammals for which aircraft strikes have been reported since 1991 include the groundhog (*Marmota monax*), striped skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), opossum (*Didelphis virginiana*), and bats and foxes (FAA n.d.[a]). According to the DOD, Partners in Flight organization, the U.S. Navy and Air Force annually report at least 3,000 bird strikes that cause over \$75 million in damage (DOD, Partners in Flight 2010).

Bird and animal hazards continue to be studied in an effort to further minimize risk to both commercial and military aircraft. Research by Dolbeer (2006) analyzed 38,961 strike reports from 1990 to 2004 in the FAA’s National Wildlife Strike Database for Civil Aviation. Dolbeer (2006) found that 74 percent (28,806) of bird strikes occurred below 500 feet above ground level, 19 percent (5,448) between 501 and 3,500 feet above ground level, and 7 percent (2,355) above 3,500 feet above ground level. Based on modeling of these data, strike frequency decreased by 32 percent for every 1,000 feet above ground level gained from 501 to 20,500 feet above ground level. Dolbeer (2006) concluded that 93 percent of all strikes occur below 3,500 feet above ground level. In addition, the FAA Aeronautical Information Manual also stated that 90 percent of all strikes occur at or below 3,000 feet above ground level (FAA 2012). Lovell and Dolbeer (1999) concluded that the exponential reduction for bird strike of 32 percent for every 1,000 feet of increase above ground level might be a useful tool for the

planning of military low-level training flights. Dolbeer (2006) also suggested an increase from 1,500 feet above ground level to 3,500 feet above ground level would decrease the mean probability of a bird strike by 54 percent.

BASH, as it pertains to both sites, will be discussed individually in this section.

3.3.1.2 Runway Design

Runway design includes the runway safety area, obstacle free zone, obstacle free area, and RPZs. Of these, the function of the RPZ is to enhance the protection of people and property on the ground. As Emporia-Greenville is within the FAA's National Plan of Integrated Airport Systems, the FAA has established RPZs at each end of Runway 15/33.

Runway Nomenclature.

Runways are named based upon the magnetic heading for each approach end of the runway. Thus, Runway 15/33 is a single, rectangular paved area, but it is considered two runways from an aircraft operations standpoint.

Similarly, WFF Main Base has established clear zones (CZs) and potential accident zones for Runways 04/22, 17/35, and the departure end of Runway 28. A clear zone is DOD/NASA naming preference for RPZ. Under the Navy's proposed action, there would be no changes to RPZs or potential accident zones at either Emporia-Greenville or WFF Main Base.

3.3.2 Existing Safety at Emporia-Greenville Regional Airport

The study area for safety at Emporia-Greenville consists of the airfield property and the RPZs depicted in Figure 3-6.

3.3.2.1 Airfield Runway Protection Zones

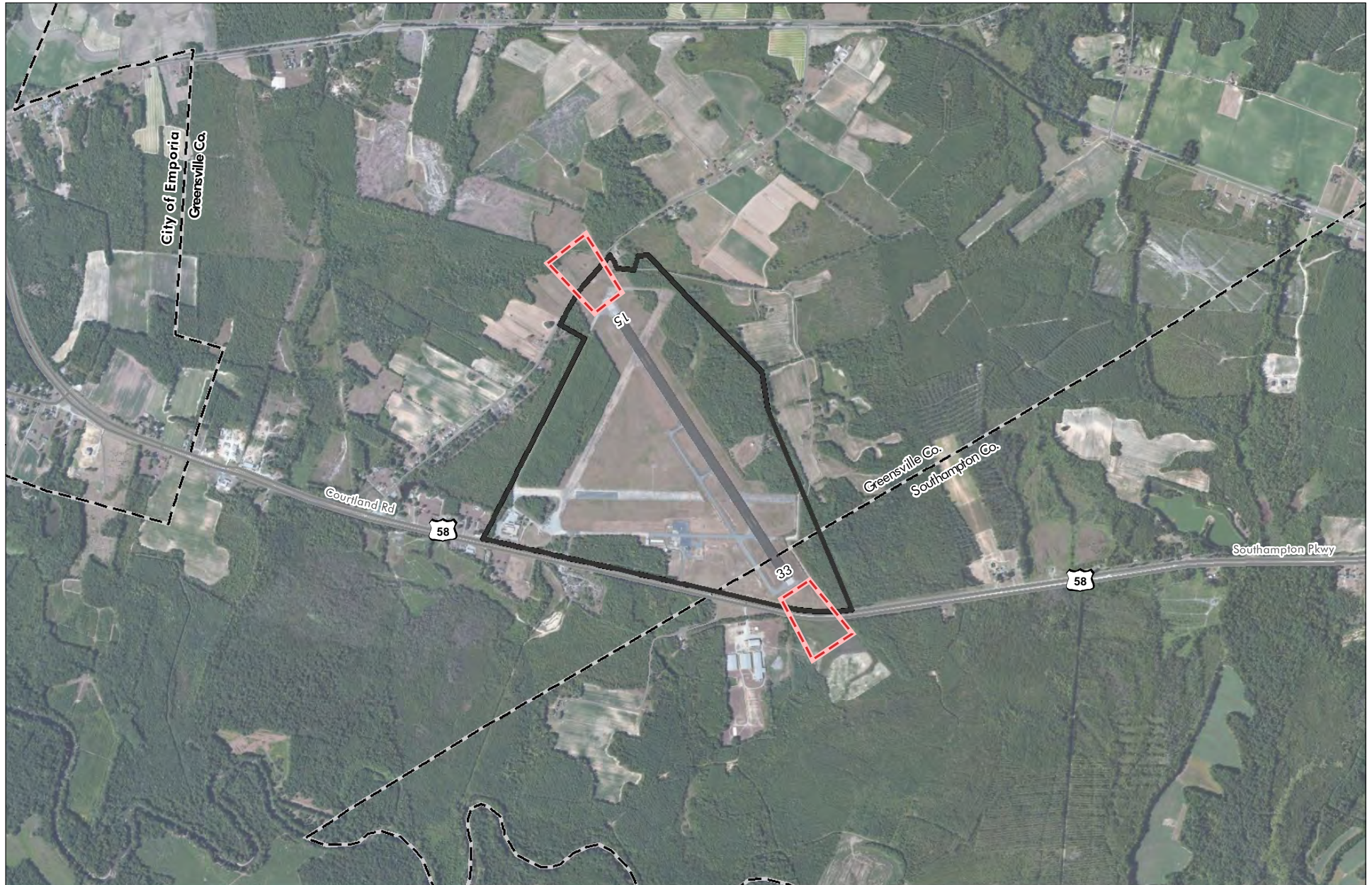
A RPZ is a trapezoid-shaped zone centered about the extended runway centerline. The RPZs are required by FAA and are depicted for Emporia-Greenville in Figure 3-6. In the area to the southeast of the runway, the RPZ extends over U.S. Route 58 and a parcel that includes a maintained forest/pine plantation. To the area northwest of the runway, the RPZ extends over James River Junction and into agricultural fields. Both of the RPZ areas include property that is outside of the Emporia-Greenville property boundary but do not include uses that are considered incompatible with aircraft operations.

3.3.2.2 Airfield Safety Record

According to airport personnel, no serious accidents have occurred at Emporia-Greenville. The most recent aircraft incident was a hard landing, with no associated serious injuries (Franklin 2011). In the case of emergencies, local emergency response services are in place to respond; these services are described in Section 3.13.1.2.

3.3.2.3 Bird/Animal Aircraft Strike Hazard

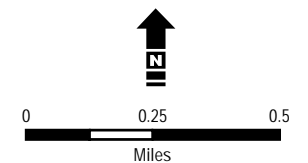
The only known instance of an animal and aircraft strike at Emporia-Greenville occurred, according to airport personnel, approximately 10 to 15 years ago and involved a deer (E & E 2011). White-tail deer tend to congregate in the northeastern portion of the airport property at dusk and occasionally cross the



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- | | |
|-------------------------------------|-----------------|
| Active Runway | County Boundary |
| Runway Protection Zone | Major Highway |
| Emporia-Greenville Regional Airport | Local Street |

Figure 3-6
Runway Protection Zones
Emporia-Greenville Regional Airport



runway. With the exception of the small wetland area in the forest east of Runway 15/33, generally no areas of ponded water at the airport attract wildlife to the runway. Of the bird species commonly struck by aircraft in Virginia, the mourning dove, sparrows, the European starling, and the eastern meadowlark could occur at or in the immediate vicinity of Emporia-Greenville. Canada geese do not typically occur in large numbers at the airport; however, other large-bodied birds, which are likely to do more damage than smaller birds if struck, including vultures and crows, may occur (E & E 2011). Gulls are unlikely to occur at the airport. Section 3.11.1.2 provides more information on birds likely to occur at Emporia-Greenville.

Several agricultural fields and small ponds that could attract birds are present in the vicinity of the airport. No landfills, recycling centers, or other facilities that could attract large numbers of birds are known to occur within 6 miles of the airport, which is the minimum recommended distance for municipal solid waste landfills from a public airport, per the FAA (FAA 2006).

3.3.3 Impacts on Safety at Emporia-Greenville Regional Airport

3.3.3.1 Impacts on Airfield Runway Protection Zones

The existing RPZs are sufficient, per FAA regulations, for the Navy's proposed action; therefore, the RPZs would not change in size or shape.

Standard air traffic management techniques would be employed during times of Navy FCLP. Emporia-Greenville would issue a NOTAM announcing the closure of the airfield during FCLP operations. The airfield UNICOM frequency would be monitored continuously during FCLP operations. Any non-FCLP aircraft approaching the airfield would be informed that the airfield is closed. Given the measures put in place to minimize interaction with private aircraft during FCLP operations, the risk of an aviation mishap occurring during FCLP operations under Alternative 1 would be minimized.

3.3.3.2 Impacts on Bird/Animal Aircraft Strike Hazard Risk

No active BASH-management techniques are currently employed at Emporia-Greenville. Relatively high numbers of vultures and crows could occasionally occur in the vicinity of the airport, and deer occasionally congregate at the northern end of the runway at dusk, temporarily posing an increased BASH risk. An increase in air operations at the airport could result in a minor increase in the potential of a BASH incident. BASH management would be provided by the airfield or through a third-party services contract, as needed. An aircrew flying in and around Emporia-Greenville would adhere to flight operations standard operating procedures, using resources such as personnel on the ground to minimize BASH exposure during higher risk times of day or migration seasons. As a result of standard flight operating procedures and implementation of airfield or third-party contractor BASH measures, as needed, BASH risk would be managed and would be expected to be low. Additionally, the altitude of the Navy's proposed holding pattern has been elevated to at or above 3,500 feet above ground level to further mitigate the BASH risk. Therefore, there would be no significant impact related to BASH potential under Alternative 1.

3.3.3.3 Safety Impact Conclusion

The existing RPZs are sufficient, per FAA regulations, for the Navy's proposed action and would not change in size or shape. The risk of an aviation mishap occurring during FCLP operations would be managed through measures put in place to minimize interaction with private aircraft during FCLP operation. BASH management would be provided by the airfield or through a third-party services contract, and the BASH risk would be further managed by elevating the E-2/C-2 holding pattern to 3,500 feet or greater. Given these considerations, there would be no significant impact to safety from the proposed action.

3.3.4 Existing Safety at Wallops Flight Facility

The study area for safety at WFF Main Base consists of the airfield property, the runway clear zones, and the runway potential accident zones depicted in Figure 3-7.

3.3.4.1 Airfield Potential Accident Zones

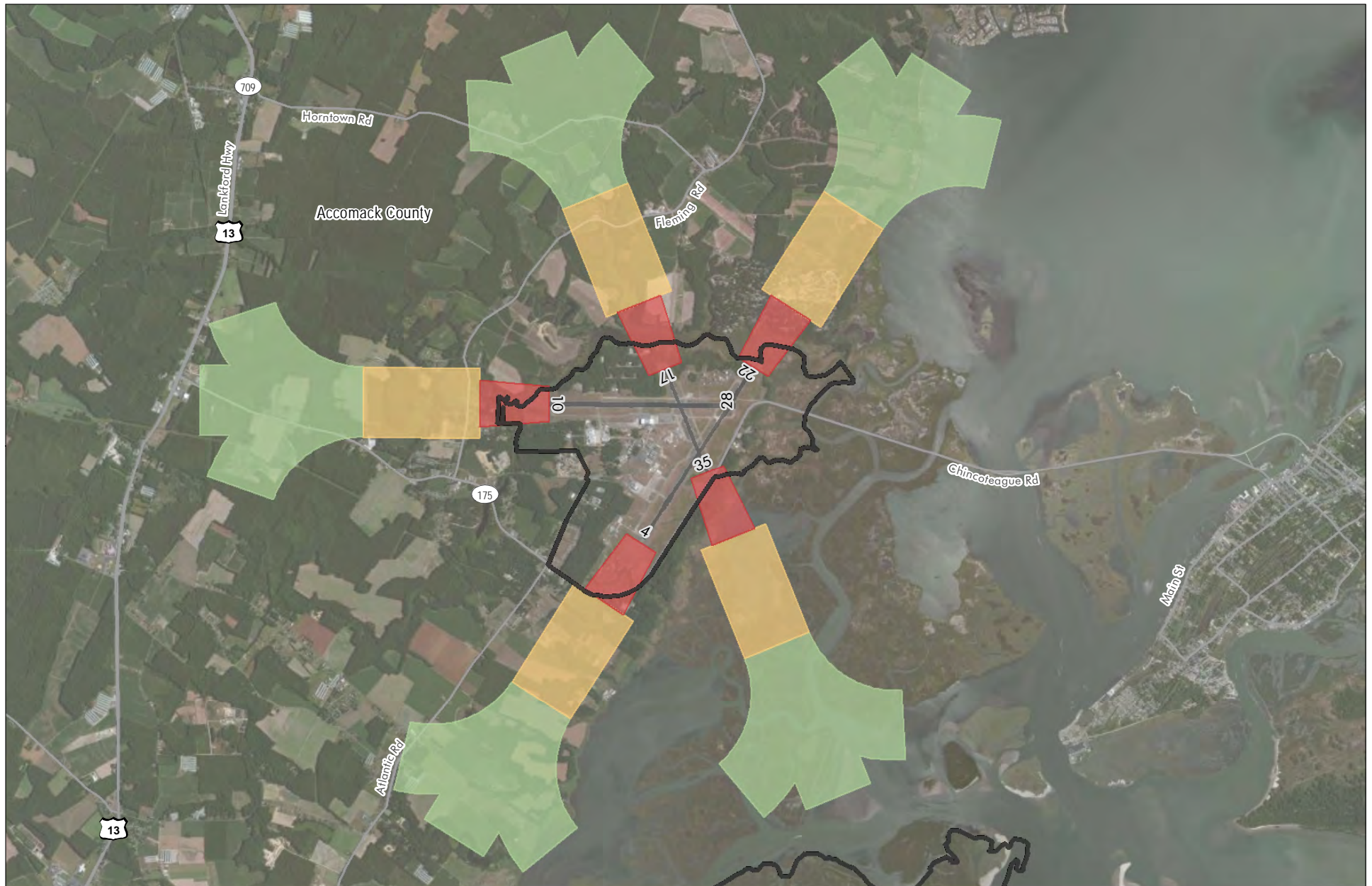
WFF Main Base is publically owned and operated by NASA, and, as such, it has established runway clear zones and runway potential accident zones 1 and 2 in its 2008 Master Plan (NASA 2008a). The runway clear zone is a trapezoidal area located immediately at the end of each runway. Within the clear zone, most land uses are incompatible with aircraft operations. For this reason, it is generally recommended that the property in a clear zone is either owned, or development rights are acquired, by the governing authority in order to ensure that incompatible development does not occur. Beyond the clear zone are the runway potential accident zones, which generally have less restrictive land use recommendations.

Runway potential accident zones are designed to minimize the potential harm if a mishap does occur by limiting development and/or activities that would result in concentrations of people in the designated runway potential accident zones. Certain land uses that concentrate large numbers of people, such as apartments, churches, and schools, are preferably avoided within these zones.

The runway clear zone and the runway potential accident zones for WFF Main Base are shown in Figure 3-7. Table 3-3 generally describes the land uses within each runway clear zone and runway potential accident zone for WFF Main Base. It should be noted that no runway clear zone or runway potential accident zones are associated with Runway 28 east of WFF Main Base, as this is over WFF property or marsh/water areas.

3.3.4.2 Airfield Safety Record

WFF Main Base has not experienced a Class A mishap in recent history.



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- | | |
|---------------------------|------------------------------|
| ■ Active Runway | Accident Potential Zone |
| □ Wallops Flight Facility | ■ Accident Potential Zone I |
| — Major Highway | ■ Accident Potential Zone II |
| — Local Street | ■ Clear Zone |

Figure 3-7
Potential Accident Zones
Wallops Flight Facility

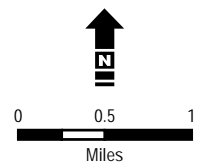


Table 3-3 General Description of Off-Base Land Uses within Runway Clear Zones and Runway Potential Accident Zones at WFF Main Base

Runway	Runway Clear Zone	Runway Potential Accident Zone 1	Runway Potential Accident Zone 2
Runway 4	Wallops Island National Wildlife Refuge	Agricultural and Watts Bay Estates residential community	Agricultural and scattered residential
Runway 10	Marsh, creek, undeveloped forest, and a mobile home community	Mobile home community, agricultural, and scattered residential	Agricultural and scattered residential
Runway 17	Marsh, water, scattered residential and agricultural	Agricultural and scattered residential	Residential community, agricultural and maintained forest/pine plantation
Runway 22	Marsh, and Trails End private waterfront campground resort	Trails End private waterfront campground resort, agricultural, marsh	Agricultural, marsh, water
Runway 28	Not applicable	Not applicable	Not applicable
Runway 35	Wallops Island National Wildlife Refuge and water	Marsh and water	Marsh and water

3.3.4.3 Bird/Animal Aircraft Strike Hazard

In November 1999, WFF entered into a Cooperative Service Agreement with the USDA, Animal Plant Health Inspection Service, Wildlife Services division (Wildlife Services) to conduct deer removal operations and to conduct preliminary wildlife abundance surveys. In February 2000, a 12-month Wildlife Hazard Assessment was initiated. The purpose of the Wildlife Hazard Assessment was to develop long-term actions to manage wildlife on the airport and within its critical airspace. WFF also began implementing immediate wildlife control measures to mitigate both short- and long-term hazards to aviation in compliance with 14 CFR 139.337—Wildlife Hazard Management. In November 2001, a Wildlife Hazard Management Plan was completed by Wildlife Services for WFF. Since the completion of both the Wildlife Hazard Assessment and Wildlife Hazard Management Plan, Wildlife Services has maintained a full-time presence at WFF to disperse and remove birds and mammals from the airfield environment (NASA 2011b). Appendix E is the December 17, 2012, Annual Monitoring Report for the Wildlife Hazard Assessment for WFF, covering October 2011 to September 2012.

WFF BASH program objectives include reducing the attractiveness of WFF to birds and wildlife by minimizing food sources, nesting sites, and roosting habitat within the airfield clear zones. The airport manager is responsible for the overall implementation of the Wildlife Hazard Management Plan and for ensuring coordination between all supporting organizations and individuals. Wildlife

Services personnel are primarily responsible for conducting bird and mammal surveys at WFF, monitoring the wildlife populations at the facility, identifying hazardous species, and dispersing wildlife that pose a hazard to aviation safety.

As part of their routine BASH services, Wildlife Services conducts visual bird surveys twice per month, year-round, at 14 points on the airfield. Surveys are conducted one-half hour after sunrise, mid-day, and 2 hours prior to dusk. Data collected include but is not limited to: weather, temperature, time, location, species, number observed, activity (behavior), habitat type, and direction of flight. While there are not currently any observation points off of WFF Main Base property, Wildlife Services does gather data on birds in the marshes that can be seen from the property. In addition to bird surveys, 14 night-time mammal surveys are conducted on the airfield per year.

The Wildlife Services staff is also responsible for completing the required application for renewing WFF's migratory bird depredation permits with the USFWS as well as WFF's state permit from the Virginia Department of Game and Inland Fisheries (VDGIF). Control tower operators, the fire department, and the aviation safety officer also have responsibilities in support of BASH management as indicated in the WFF Wildlife Hazard Management Plan.

Wildlife Services sets a "bird condition" at WFF as a reflection of current BASH hazards for flight operations. The "bird condition" is a direct result of the point surveys and other observations by Wildlife Services. The WFF Fire Department conducts a twice daily sweep (at dawn and at dusk) of the airfield for foreign object debris such as live animals, carcasses, or debris that could interfere with flight operations (U.S. Department of the Navy 2012).

Wildlife Services personnel implement the techniques identified in the BASH management plan, which can include: identifying and manipulating species habitat and roosts, employing techniques to disperse species, and, if deemed necessary, removal of birds and/or mammals that pose a hazard to human health and aviation safety under appropriate permits. WFF has had a zero tolerance policy for deer within the Aircraft Operations Area. Efforts to reduce the number of deer on the airfield, including habitat management, fence construction and maintenance, and removal, have been very effective (NASA 2011b). Wildlife Services has specialized equipment, including an infrared camera and spotlights, to aide personnel in detecting deer and other nocturnal wildlife during monthly nighttime surveys. As necessary, and as permitted, additional BASH management methods may be used to reduce the number of birds and other wildlife on the airfield, including habitat modification (tree/brush removal, grass cutting, controlled burns, herbicide applications, and vegetation introductions), use of bird control measures (pyrotechnics and propane cannons), and removal (dispersing, trapping and relocating, and, if necessary, by permit, shooting) (NASA 2011b).

Areas within 3 miles of WFF have been identified that may provide attractants to birds, such as agricultural fields, landfills, water habitats, night-time roost locations, and nesting areas. These areas could pose a BASH risk if birds

transition from the airfield to these sites. The Audubon Society's Barrier Island/Lagoon System Important Bird Area, encompassing the Wallops Island National Wildlife Refuge and Chincoteague National Wildlife Refuge, is located to the east of WFF Main Base (see Figure 3-24 and Section 3.11.3.2 for more on the Important Bird Area and the National Wildlife Refuges). The Accomack County North Landfill is approximately 3 miles southwest of WFF Main Base, but it does not currently cause any significant bird hazards.

According to WFF reports, 76 wildlife strike incidents were reported at WFF between August 1981 and October 2012 (Table 3-4) (USDA APHIS WS 2012). Gulls accounted for close to 50 percent of the reported strikes. Seventy-one percent of the strikes occurred between the months of May and September. Most wildlife strikes at WFF have occurred during dawn and daylight hours. The dawn and daylight hours are the most active period for aircraft movements at WFF and the most active period for most bird species (USDA APHIS WS 2012).

Table 3-4 Documented Wildlife Strikes by Species Group at the Wallops Flight Facility from August 1981 through October 2012

Species Group	Number of Reported Strikes
Gull	37
Unknown Bird	10
Meadowlarks	5
Starlings/Blackbirds	4
Swallows/Swifts	5
Raptors	4
Cervids (white-tailed deer)	3
Wading Birds	2
Sparrows	3
Shorebirds	2
Columbids (doves and pigeons)	1
Total	76

Source: USDA APHIS WS 2012

A turkey vulture (*Cathartes aura*) and black vulture (*Coragyps atratus*) roost site was identified by the WFF BASH program at a communication tower on Verizon Communication property off Atlantic Road near Navy housing (NASA 2011b). Wildlife Services staff obtained an agreement from the USFWS to harass the roosting birds in this area until they relocated to an area that was not considered a BASH risk. Also, a special use permit was obtained from the USFWS to harass/remove turkey and black vultures from the Wallops Island National Wildlife Refuge, located east of the aircraft operations area on State Route 175 (NASA 2011b).

3.3.5 Impacts on Safety at Wallops Flight Facility Main Base

3.3.5.1 Impacts on the Airfield Potential Accident Zones

Implementation of Alternative 2 would have no impact on the clear zones or Potential Accident Zones at WFF Main Base or the lands that fall beneath these zones.

Standard air traffic management techniques would be employed during times of Navy FCLP. WFF Main Base would issue a NOTAM announcing the status of FCLP operations at the airfield. The airfield universal communications frequency would be monitored continuously during FCLP operations. In addition, during hours when the airfield is open, the air traffic control tower will monitor and direct non-FCLP participating aircraft, as necessary. Given the measures put in place to minimize interaction with other aircraft during FCLP operations, the risk of an aviation mishap occurring during FCLP operations under Alternative 2 would be minimized.

3.3.5.2 Impacts on Bird/Animal Aircraft Strike Hazard Risk

Alternative 2 would not result in the creation of attractants having the potential to increase the concentration of birds around the runway at WFF Main Base. However, the increase in annual air operations under Alternative 2 would result in a minor potential increase in exposure to BASH hazards.

As stated in Section 3.3.1.1, hazardous wildlife control at WFF Main Base is primarily managed through an interagency agreement between NASA and the USDA Animal and Plant Health Inspection Service, Wildlife Services, in accordance with the facility's Wildlife Hazard Management Plan. Overall, WFF has a robust BASH program. If WFF were chosen as the airfield to support E-2/C-2 FCLP training, WFF will manage any potential increase in the risk of bird/animal-aircraft interactions as part of airfield support services. BASH measures will be implemented to ensure safety for night time Navy operations. If deemed necessary, as a result of the Navy's proposed action, Wildlife Services will expand its BASH surveys and mitigation measures to incorporate the areas under the FCLP and holding patterns. Wildlife Services is responsible for obtaining permissions and permits if BASH management practices are implemented outside WFF property. Additionally, aircrews flying in and around WFF Main Base will adhere to the facilities' flight operations standard operating procedures, using all available resources such as communication with the control tower, to minimize exposure during higher risk times of day and migration seasons.

3.3.5.3 Safety Impact Conclusion

Implementation of Alternative 2 would have no impact on the clear zones or Potential Accident Zones at WFF Main Base or the lands that fall beneath these zones. The risk of an aviation mishap occurring during FCLP operations would be managed through measures put in place to minimize interaction with private aircraft during FCLP operation. WFF Main Base has an existing, robust BASH management program, which will be adhered to and expanded upon, as needed, and all flight operations standard operating procedures will be followed. Given

these considerations, there would be no significant impact to safety from the proposed action.

3.4 Air Quality

To evaluate air quality impacts associated with new Navy aircraft operations at Emporia-Greenville or WFF, annual emissions from direct and indirect sources associated with the new aircraft operations and airfield improvements were totaled to determine the impact to the region. Only new aircraft operations were considered, as existing operations are not expected to change as a result of the proposed action. Construction, such as the placement of concrete and asphalt pads and fencing, has been considered, as well as material and worker transportation.

Construction emissions would be temporary and assumed to occur for approximately 6 months leading up to the start of Navy FCLP operations. Construction activities considered in this evaluation include all operations of construction equipment and on-road and off-road vehicles, in addition to particulate emissions from site preparation and volatile organic compounds (VOCs) from paving operations.

Emission rates for construction operations were developed using EPA NONROAD equipment emission rates and other EPA guidelines (see Appendix C, Air Quality Calculations). Particulate emissions from site preparation and VOC emissions from paving were estimated separately.

Emissions from the proposed Navy aircraft operations were estimated using Navy Aircraft Environmental Support Office emission factors (see Appendix C, Air Quality Calculations), which are the most accurate factors for Navy aircraft. Total emissions were calculated for landing and takeoff operations (combined arrival and departure) and pattern operations using Aircraft Environmental Support Office pattern and mission operation emission factors.

Emporia-Greenville and WFF are located in a region that is in attainment of the National Ambient Air Quality Standards, or unclassified, for all criteria pollutants. The General Conformity Rule regulations, therefore, do not apply to this action, and General Conformity Rule exemption thresholds do not apply.

As discussed in Section 1.5.2, mobile and temporary emissions are not subject to the Prevention of Significant Deterioration standards; however, the Prevention of Significant Deterioration thresholds provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards.

3.4.1 Existing Air Quality at Emporia-Greenville Regional Airport

The study area for air quality at Emporia-Greenville is Greenville County and Southampton County (the City of Emporia is tracked with Greenville County for air quality standards).

Due to the rural nature of the area, the air emissions in Greenville County are minimal; of the 3,190 permitted sources in Virginia, only 17 are located in Greenville County, and these sources emitted less than 1 percent of total emissions reported in the commonwealth in 2009 (VDEQ 2011a). Transportation emissions are not tracked, monitored, or reported in the county but are assumed to be negligible due to the rural nature of the area and low density of population.

At Emporia-Greenville, there are no stationary sources subject to Title V permitting. The airport experiences approximately 2,320 civilian and military flight operations annually. However, air quality emissions associated with Emporia-Greenville activities have not been quantified because the county is in attainment and there are minimal operations in the existing environment.

3.4.2 Impacts on Air Quality at Emporia-Greenville Regional Airport

Estimated emissions of criteria pollutants from construction are summarized in Table 3-5. Detailed calculations are provided in Appendix C, Air Quality Calculations.

Table 3-5 Estimated Construction Emissions at Emporia-Greenville Regional Airport

Activity	Emissions (tons/yr)					
	VOC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}
Construction Emissions						
Construction equipment use on site (exhaust emissions)	0.11	0.60	1.25	0.003	0.10	0.10
On-road transportation vehicle emissions from deliveries and worker commuting	0.25	2.32	0.18	0.002	0.52	0.06
VOCs from paving	0.06	-	-	-	-	-
PM ₁₀ from site preparation and grading	-	-	-	-	0.02	-
Total Construction Emissions	0.42	2.92	1.43	0.01	0.64	0.16

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- SO₂ = sulfur dioxide
- VOC = volatile organic compounds

Existing civilian and military aircraft operations at Emporia-Greenville are under 2,500 operations per year and are assumed to remain the same; therefore, emissions from these operations have not been quantified. Since the E-2/C-2 aircraft would not refuel or shut down at the airport, ground and building operations would remain unchanged and have not been included in this air quality assessment.

Estimated emissions of criteria pollutants from proposed Navy aircraft operations are summarized in Table 3-6. Even though the holding area has been altered since the Draft EA, the air quality emissions modeling uses conservative emission factors and assumptions. Therefore, air emissions generated from the altitude change for the holding pattern would not be more than those previously modeled,

which are presented in Table 3-6. Detailed calculations are provided in Appendix C, Air Quality Calculations.

Table 3-6 Estimated Aircraft Operation Emissions at Emporia-Greenville Regional Airport

Aircraft Activity	Total Operations	Emissions (tons/yr)				
		VOC	NO _x	CO	SO ₂	PM ₁₀
E-2/C-2 Operations						
E-2/C-2 LTOs (each LTO counts as two operations)	1,406	0.05	1.26	0.23	0.06	0.55
E-2/C-2 Patterns	43,594	2.49	62.08	10.99	2.78	27.55
Total	45,000	2.54	63.34	11.22	2.84	28.10

Key:

- CO = carbon monoxide
- LTO = landing and takeoff operations
- NO_x = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- SO₂ = sulfur dioxide
- VOC = volatile organic compounds

As discussed in Section 1.5.2, mobile and temporary emissions are not subject to the Prevention of Significant Deterioration standards; however, the Prevention of Significant Deterioration thresholds provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards. As indicated in Tables 3-5 and 3-6, both temporary construction emissions and annual operating emissions are projected to be between 0.01 and 63.34 tons per year and therefore would have no significant impact on air quality in the region.

3.4.3 Existing Air Quality at Wallops Flight Facility

The study area for air quality at WFF is Accomack County. There are no ambient air quality monitors in Accomack County; the closest monitor is located at the Assateague Island National Seashore in Worcester, Maryland. Data from this station can be used to generally determine whether air quality in the region is meeting the standards. This monitoring station measures ozone, and the annual fourth-highest daily maximum 8-hour concentration, averaged over 2008, 2009, and 2010, is 0.070 ppm, which is below the 0.075 ppm standard (U.S. EPA 2011).

Compared to other areas of Virginia, air emissions in Accomack County are minimal; of the 3,190 permitted air emission sources in Virginia, only 21 are located in Accomack County. These sources emitted 0.2 percent of total emissions reported in Virginia in 2009 (VDEQ 2011a). The largest stationary source of emissions in Accomack County is Tyson Foods. Transportation emissions are not tracked, monitored, or reported in the county, but they are assumed to be negligible due to the rural nature of the area and low density of population.

WFF Main Base is a NASA facility, but it also supports various flight operations of other state and federal agencies. These operations include air emissions sources such as aircraft, ground transportation, fuel tanks, fuel-loading operations,

and fugitive building systems emissions. Other operations and ground activities are not expected to change and therefore have not been quantified.

WFF Main Base is permitted through the Commonwealth of Virginia DEQ as a synthetic minor stationary air emissions source, which means it voluntarily controls its annual emissions not to exceed Title V permitting thresholds. Total point source emissions (which are a subset of all facility emissions and do include mobile emissions) are reported annually, and emissions reported in 2011 are listed in Table 3-7.

Table 3-7 Existing Stationary Emissions at Wallops Flight Facility (2011)

	Emissions (tons/yr)				
	CO	NO _x	VOCs	SO ₂	PM ₁₀
Reported Stationary Source Emissions, 2011	1.81	8.05	0.28	6.86	0.69

Source: VDEQ 2011a

3.4.4 Impacts of Air Quality at Wallops Flight Facility

Estimated emissions of criteria pollutants from construction are summarized in Table 3-8. Even though the holding area has been altered since the Draft EA, the air quality emissions modeling uses conservative emission factors and assumptions. Therefore, air emissions generated from the altitude change for the holding pattern would not be more than those previously modeled, which are presented in Table 3-9. Detailed calculations are provided in Appendix C, Air Quality Calculations.

Table 3-8 Proposed Construction Emissions under Alternative 2 at Wallops Flight Facility

Activity	Emissions (tons/yr)					
	VOC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}
Construction Emissions						
Construction equipment use on site (exhaust emissions)	0.11	0.60	1.25	0.003	0.10	0.10
On-road transportation vehicle emissions from deliveries and worker commuting	0.25	2.32	0.18	0.002	0.52	0.06
VOCs from paving	0.06	-	-	-	-	-
PM ₁₀ from site preparation and grading	-	-	-	-	0.02	-
Total Construction Emissions	0.42	2.92	1.43	0.01	0.64	0.16

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- SO₂ = sulfur dioxide
- VOC = volatile organic compounds

Table 3-9 Estimated Aircraft Operation Emissions at Wallops Flight Facility

Aircraft	Total Operations	VOC	Emissions (tons/yr)			
			NO _x	CO	SO ₂	PM ₁₀
E-2/C-2 Operations						
E-2/C-2 LTOs (each LTO counts as two operations)	1,406	1.32	1.93	2.17	0.11	1.05
E-2/C-2 Patterns	43,594	2.49	62.08	10.99	2.78	27.55
Total	45,000	3.81	64.01	13.16	2.89	28.60

Key:

- CO = carbon monoxide
- LTO = landing and takeoff operation
- Nox = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- SO₂ = sulfur dioxide
- VOC = volatile organic compounds

Emissions associated with Navy E-2/C-2 aircraft operations at WFF Main Base were evaluated for their impact on air quality. Existing civilian and military aircraft emission levels were assumed to remain the same; therefore, emissions from these operations have not been quantified. Since WFF Main Base has refueling capabilities, it was conservatively assumed that all proposed landing and takeoff operations (combined arrival and departure) include hot-refueling, but no other ground operational changes have been included in this air quality emissions assessment. All ground and building operations would remain unchanged, so they were not included in the air emission calculations.

If the Navy decides to send detachments to WFF Main Base instead of flying from NS Norfolk Chambers Field for each FCLP period, the total number of aircraft operations modeled does not change. However, there would be more takeoffs from a static position at WFF Main Base rather than arriving from NS Norfolk Chambers Field already airborne. This makes a slight difference from an aircraft emissions standpoint, as a static takeoff has a slightly higher emission factor. Estimated emissions of criteria pollutants from proposed Navy aircraft operations are summarized in Table 3-9 and represent the detachment scenario at WFF Main Base, which would be the worst-case scenario for aircraft emissions. Detailed calculations are provided in Appendix C, Air Quality Calculations.

As discussed in Section 1.5.2, mobile and temporary emissions are not subject to the Prevention of Significant Deterioration standards; however, the Prevention of Significant Deterioration thresholds provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards. As indicated in Tables 3-8 and 3-9, both temporary construction emissions and annual operating emissions are projected to be between 0.01 and 64.01 tons per year and therefore would have no significant impact on air quality in the region.

3.5 Noise

Noise is unwanted sound. Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (e.g., music) or unpleasant

(e.g., jackhammers) depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration.

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. Because of this vast range, using a linear scale to represent the intensity of sound becomes very unwieldy. As a result, a logarithmic unit known as a decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall 1995).

Because of the logarithmic nature of the decibel unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two [example: $60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}$].

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of a sound's loudness, and this relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear.

Table 3-10 provides a comparison of some everyday sounds, their corresponding dB levels, and how they are perceived by a listener.

There are two main types of noise events: steady and transient. A steady noise event is one in which sound is emitted steadily from a point source; an example would be the hum of a fluorescent light bulb. A transient noise event is one in which a generated sound passes through an area such that the sound rises above the ambient level (i.e., the existing background noise) to some maximum level and then decreases back below the ambient level. Examples of sources of transient noise events are cars and aircraft; they generate noise that gradually increases as they approach the area and then decreases as they leave the area. Details of a specific transient noise event, such as duration, noise level, and distance between the noise source and receptor, are used to calculate certain noise metrics discussed in this section.

Table 3-10 Decibel Levels of Some Common Sounds

Sound Source (at a given distance)	Steady or Maximum Decibel Level (dB)
Gun Shot (at muzzle)	140-150
Jackhammer (50 feet)	120-125
Auto horn (3 feet)	115
Chain saw (operating)	105-115
Live rock concert (50 feet)	105-110
Circular saw (operating)	100-105
Shout (0.5 foot)	100
Squealing pigs (10 feet)	95-100
Combine (full throttle; 10 feet)	90-100
Subway station	90
Heavy truck (50 feet)	80
Garbage disposal (3 feet)	80
Tractor (operating; enclosed cab)	75-80
Vacuum cleaner (3 feet)	70-80
Freeway traffic (50 feet)	70
Normal conversation (5 feet)	60-65
Air conditioning unit (20 feet)	60
Large electrical transformers (100 feet)	45-55
Quiet suburb	50
Light auto traffic (50 feet)	50
Bird calls (distant)	35-45
Library	25-35
Soft whisper (5 feet)	25-35
Quiet rural area	10-20
Human breathing	10-20
Threshold of human hearing	0

Sources: New York State Department of Environmental Conservation 2001; AgriSafe 2009; Federal Interagency Committee on Noise (FICON) 1992; M.C. Branch et al., 1970.

Noise Metrics

Various metrics are used to describe the sound environment and to quantitatively measure the effect of noise on the environment. In this EA, DNL and the SEL are used to express the existing noise effects on the environment.

Day-Night Average Sound Level

Around a military or civilian airfield, the noise environment is normally described in terms of the average sound level generated over a period of time by aircraft operating at that facility. The approved federal noise measure used by the FAA, the U.S. EPA, and other federal agencies for assessing aircraft noise exposures in communities in the vicinity of airfields is the DNL metric, in units of dB. DNL has been found to provide the best measure of long-term community reaction to transportation noise, especially aircraft noise.

In order to generate DNL noise contours, the DOD analyzes aircraft noise using two noise modeling software packages: NOISEMAP (the primary DOD-approved noise analysis tool) and the Rotorcraft Noise Model (RNM, the DOD-recommended noise model for helicopter noise modeling). Both software packages were used to calculate the existing and proposed noise contours for

Emporia-Greenville due to the mix of fixed-wing and rotary-wing aircraft currently operating there. The existing and proposed noise contours for WFF Main Base were modeled using NOISEMAP only because the number of rotary-wing aircraft operating at WFF Main Base is minimal and would not increase the size of noise contours. These models use aircraft-specific noise characteristics as well as specific environmental conditions in the area where the aircraft would be flying in order to generate the projected noise contours. Some of the primary factors that influence aircraft noise, which are used in the models, include:

- Aircraft type;
- Number and time of operations;
- Flight tracks;
- Aircraft power settings, speeds, and altitudes;
- Numbers, duration, and location of engine maintenance run-ups;
- Terrain; and
- Environmental data (temperature and humidity).

In addition to those listed above, RNM also uses the following factors to model rotary-wing aircraft:

- Climb and dive rates; and
- Angles of rotation (roll, pitch, and yaw).

For the noise generated by specific military and civil aircraft, the DOD draws on vast aircraft noise libraries that contain acoustic information on aircraft in the military and civil aircraft inventories, measured under controlled conditions. Aircraft noise characteristics from the noise libraries are used in the models, adjusting the characteristics to local environmental conditions, to accurately predict the noise environment.

For the purposes of this analysis, DNL is calculated to represent the average sound level generated by all aviation-related operations during an average 24-hour period, with sound levels of acoustic night noise events adjusted by adding a 10-dB penalty. The 10-dB penalty accounts for the generally lower ambient sound levels and greater community sensitivity to noise during late-night and early-morning hours. Acoustic day is defined as the period of time from 7:00 a.m. to 10:00 p.m., and acoustic night is the period of time from 10:00 p.m. to 7:00 a.m. the following morning.

The DNL for the existing noise environment is depicted as a series of contours that connect the specific points of equal value, usually in 5-dB increments. The area between two noise contours is called a “noise zone.” The noise zones used to evaluate noise exposure in the vicinity of Emporia-Greenville and WFF Main Base are as follows and are generally accepted ranges to evaluate the community’s reaction to noise:

- 65 to 70 dB DNL,
- 70 to 75 dB DNL, and
- Greater than 75 dB DNL.

Community reaction to noise and land use planning recommendations generally begin at the 65 dB DNL noise contour because, for purposes of compliance with 14 CFR Part 150 (2007), all land uses are considered to be compatible with noise levels less than 65 dB DNL. Other DNL levels are used to assess potential impacts besides the community's reaction, such as for potential hearing loss.

Sound Exposure Level

In addition to presenting DNL values, which capture the average noise environment over a period of time for numerous events, SELs are used as a supplemental metric in this study to quantify the noise exposure related to a single event and help to describe the different aspects of examining noise. As such, SEL represents the best metric to compare the noise levels from different overflights; DNL remains the accepted metric for measuring the community's reaction to transportation noise. SEL represents both the intensity (loudness) of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event, and a period of time during which the event is heard. SEL provides a measure of the net exposure of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the maximum noise level and the lower noise levels produced during onset and recess periods of the overflight.

The SEL describes the noise associated with a single event at a specific location. Aircraft noise will vary from event to event according to aircraft type and model, aircraft configuration, engine power settings, aircraft speed, weather conditions, and distance between the observer and the aircraft. SEL represents the best metric to compare noise levels from different overflights.

Potential Hearing Loss

The 1982 U.S. EPA *Guidelines for Noise Impact Analysis* specifically address the criteria and procedures for assessing noise-induced hearing loss in terms of the Noise-Induced Permanent Threshold Shift, a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (U.S. EPA 1982). Numerically, the Noise-Induced Permanent Threshold Shift is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kilohertz that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. A grand average of the Noise-Induced Permanent Threshold Shift over time (40 years) and hearing sensitivity (10th to 90th percentiles of the exposed population) is termed the Average Noise-Induced Permanent Threshold Shift.

With regard to military air installations, a 2009 DOD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to a DNL greater than or equal to 80 dB (DOD 2009). DNL is the science-based FAA- and DOD-accepted metric for assessing potential long-term hearing loss. Specifically, DOD components are directed to "use the 80 DNL noise contour to identify populations at the most risk of potential hearing loss."

The average sound metric of DNL is specifically used for assessing long-term potential hearing loss, not SEL, which is from a single event.

3.5.1 Existing Noise at Emporia-Greenville Regional Airport

The study area for noise at Emporia-Greenville consists of the area within the modeled 65 dB and greater noise contour.

NOISEMAP was used to model fixed-wing aircraft as well as the Army's CH-47 Chinook helicopter, which does not have noise reference data within the Rotorcraft Noise Model. The Rotorcraft Noise Model, which is the DOD-recommended noise model for helicopter noise modeling, was used to model the Navy's MH-53E Sea Dragon helicopter.

Information on the number and type of aircraft operations, the acoustic day/night split, runway utilization, and flight tracks was used in the models to determine the existing noise environment at Emporia-Greenville. Emporia-Greenville is a public general aviation airport and hosts approximately 1,144 civilian fixed-wing, 36 military fixed-wing, and 1,140 military helicopter operations per year. A total of four aircraft are based at the airport, all of which are fixed-wing (three single-engine airplanes and one twin-engine airplane). The majority of aircraft that utilize Emporia-Greenville are transient, meaning they utilize the airport but are not permanently based there.

The annual operations at Emporia-Greenville used to develop the existing noise contours are presented in Table 3-11. Refer to Appendix B, Noise Analysis, for more information and details regarding the assumptions and modeling used to estimate the existing environment noise exposure.

Table 3-11 Existing Annual Operations, Emporia-Greenville Regional Airport

	Departures	Arrivals	Pattern	Total
Civilian Fixed-Wing Aircraft				
Single Engine (Cessna 172)	243	243	486	972
Twin Engine (Beechcraft King Air 90)	46	46	-	92
Business Jet (Lear 35 or Cessna Citation)	40	40	-	80
Subtotal Civilian Fixed-Wing Operations				1,144
Military Fixed-Wing Aircraft				
Twin Engine (CASA 212)	2	2	32	36
Subtotal Military Fixed-Wing Operations				36
Military Rotary-Wing Aircraft				
Twin Engine (CH-47)	220	220	580	1,020
Single Engine (MH-53)	30	30	60	120
Subtotal Military Rotary-Wing Operations				1,140
Total				2,320

Source: BRRC 2012

For the fixed-wing aircraft, based upon the discussions with the airport manager, the noise analysis modeled 85 percent of the single- and twin-engine propeller aircraft operations occurring during acoustic daytime, 15 percent of the single- and twin-engine propeller aircraft operations occurring during acoustic nighttime, and 100 percent of corporate jet aircraft and military fixed-wing aircraft operations occurring during acoustic daytime. The noise analysis also modeled 95 percent of the military rotary-wing aircraft operations occurring during acoustic daytime and 5 percent occurring during acoustic nighttime (BRRC 2012). Due to the instrumented approach on Runway 33 and discussions with the airport manager, the noise analysis modeled 75 percent of the operations on Runway 33 and 25 percent of the operations on Runway 15 (BRRC 2012).

3.5.1.1 Day-Night Average Sound Level Analysis

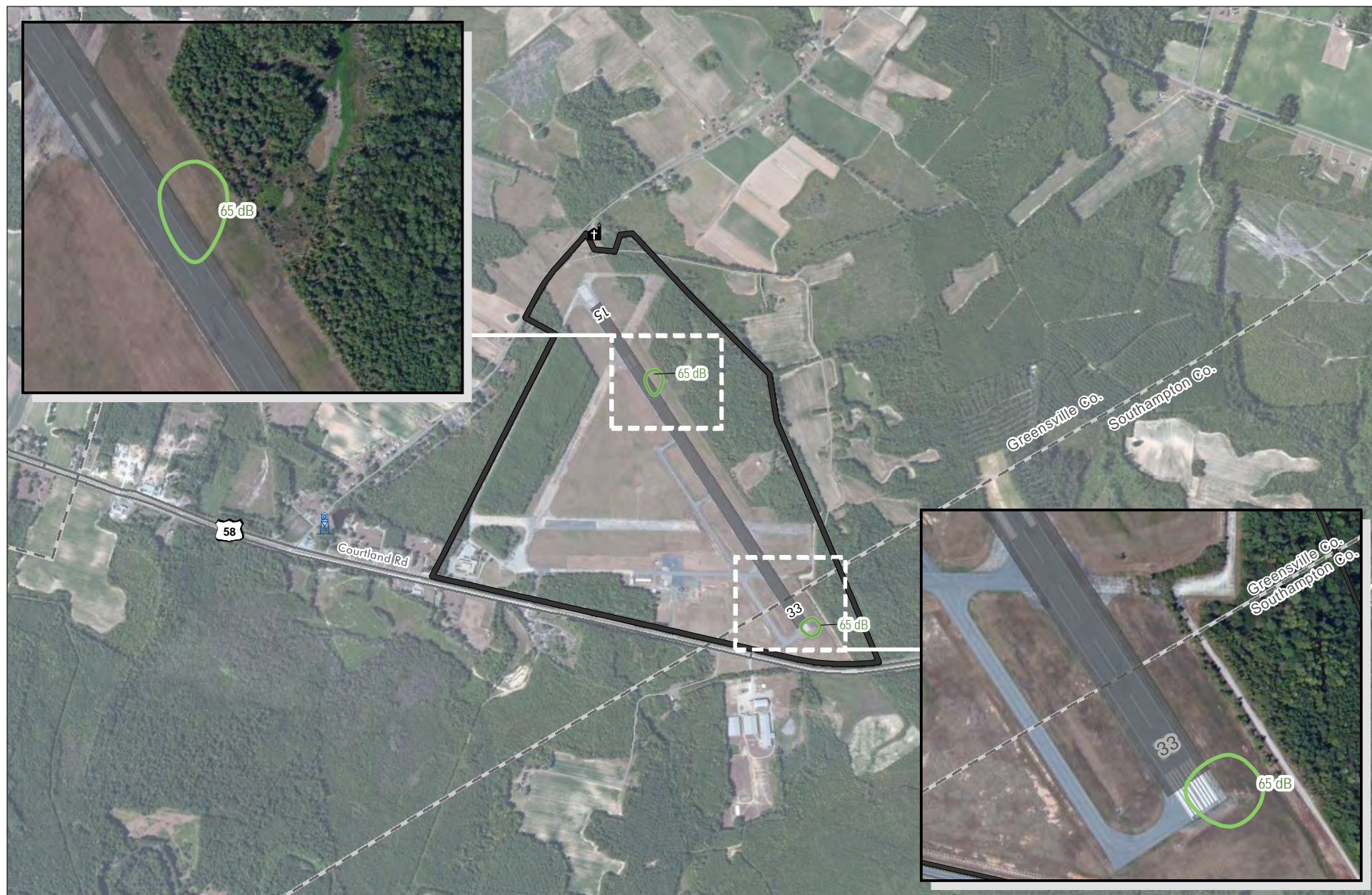
The existing noise contours modeled for Emporia-Greenville fall over Greenville County and Southampton County, Virginia (Figure 3-8). The existing noise zones that are 65 dB DNL or greater do not extend outside of the airport boundary. The limited number of overall aircraft operations, along with the type of aircraft, result in very small 65 dB DNL or greater noise zones along Runway 15/33. This is considered an annual average metric, and even though individuals residing around the airport may experience noise during times of aircraft operations, the overall existing environment would be categorized at a low noise level. Given Emporia-Greenville's location along U.S. Route 58, truck traffic would also be present in the vicinity of the airport; however, vehicle traffic was not modeled as part of this analysis.

3.5.1.2 Sound Exposure Level Analysis

As part of the noise analysis, the Navy modeled the SEL values at specific points of interest identified through coordination with City of Emporia and Greenville County and Southampton County representatives. These locations include residential areas, schools, religious facilities, and other locations where noise could be a concern. Twenty-eight points of interest were identified. The noise analysis presents the maximum modeled SEL value for each specific point of interest for aircraft operations currently at Emporia-Greenville. The points of interest identified by the city and county representatives, as well as the Navy, are shown on Figure 3-9. Table 3-12 presents a description of the aircraft, operation type, distance to the aircraft, and modeled SEL value for each point of interest.

The Location ID presented in Table 3-12 corresponds to a point of interest depicted on Figure 3-9.

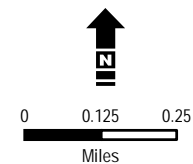
The maximum modeled SEL values under existing conditions at Emporia-Greenville are dominated by MH-53 helicopters performing pattern operations. Other aircraft and operations that generate elevated SEL values for points of interest include CH-47 helicopter operations and business jet operations. The SEL values range from a low of 38.4 dB SEL to a high of 110.0 dB SEL. It should be noted that potential hearing loss is measured using the average noise metric, DNL, not SEL.



Source: ESRI 2010

- | | | |
|--------|-------------------------------------|-----------------|
| School | Hospital | Runway |
| Church | Existing Noise Contour (dB) | County Boundary |
| Tower | Emporia-Greenville Regional Airport | Interstate |
| | | Major Highway |
| | | Local Street |

Figure 3-8
Modeled Existing Noise Contours
Emporia-Greenville Regional Airport



3.5.2 Noise Impacts at Emporia-Greenville Regional Airport

There are two potential operating scenarios under Alternative 1. The proposed aircraft operations are the same between both scenarios; therefore, it is presented as one subsection. However, the DNL and SEL analysis results in slightly different values if the E-2/C-2 aircraft are operating in a three-plane only or a three- and five-plane scheme.

3.5.2.1 Proposed Aircraft Operations

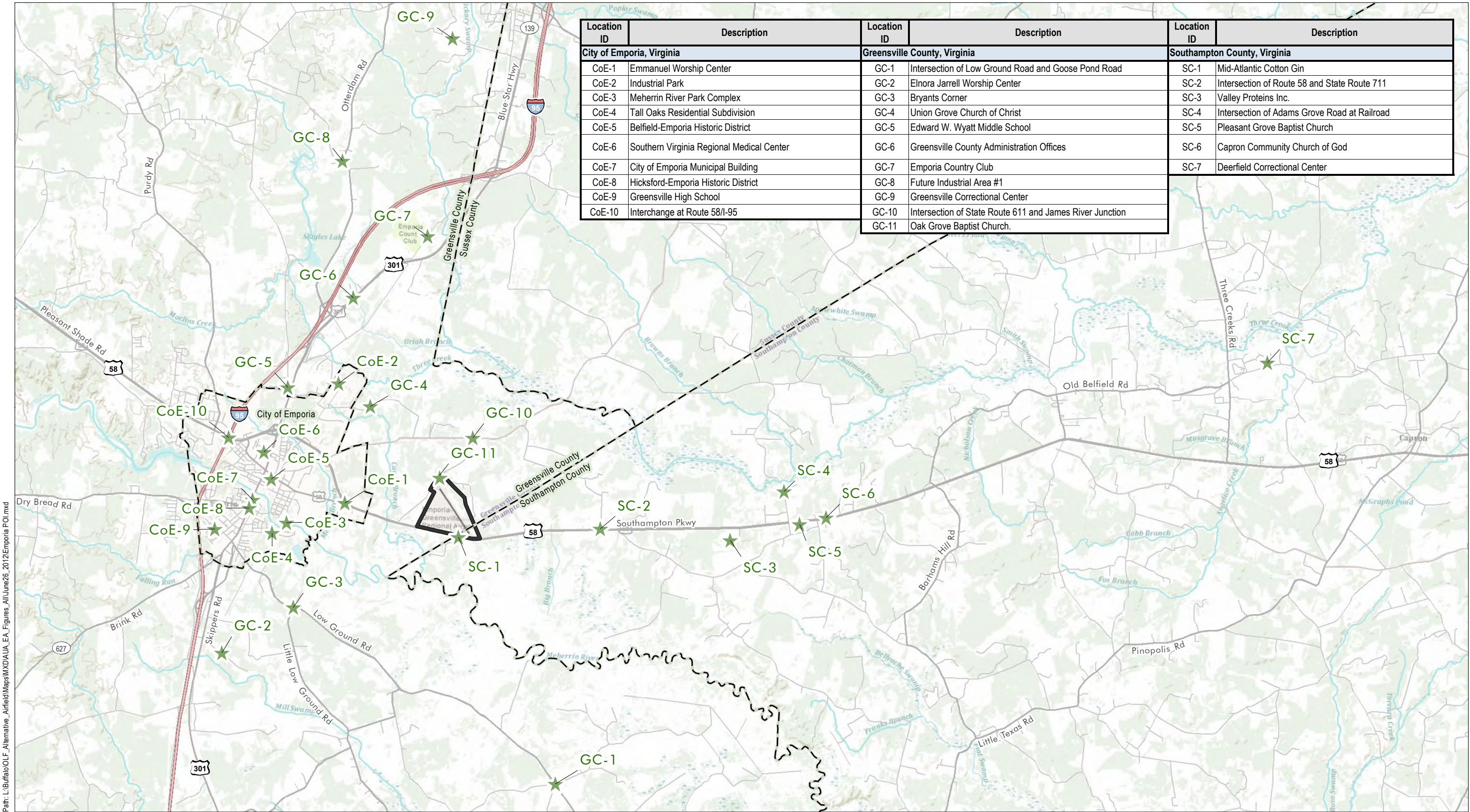
Under Alternative 1, the Navy would conduct up to 45,000 E-2/C-2 operations annually at Emporia-Greenville. The number of existing civilian and military aircraft operations at Emporia-Greenville is not expected to change and would continue to operate, as was outlined in Section 3.2.2.1. The existing aircraft operations are included in the projected noise contours. The projected annual operations under Alternative 1 are listed in Table 3-13. Because existing operations are expected to remain the same, the table presents all existing aircraft operations (previously presented in Table 3-1) as well as the addition of the Navy's E-2/C-2 operations. These aircraft operations were modeled using NOISEMAP and Rotorcraft Noise Model to determine noise impacts at Emporia-Greenville.

Approximately half of the proposed Navy E-2/C-2 training under Alternative 1 would be conducted during daylight hours and half during hours of darkness. For the purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours and would end as soon as possible. Because sunset occurs later during the long daylight hours of the summer months, FCLP training that begins after sunset may continue as late as 1:00 a.m., or later.

As described in Section 3.5, acoustic night is a noise analysis term. Operations during acoustic night (defined as between the hours of 10:00 p.m. and 7:00 a.m.) are "penalized" by adding 10 dB to account for the lower background sound levels and greater community sensitivity to noise during late-night and early morning hours. In order to minimize noise impacts to the community to the greatest extent feasible, the Navy attempts to end flight operations before 10:00 p.m. whenever possible.

3.5.2.2 Day-Night Average Sound Level Analysis

The Navy's E-2/C-2 aircraft could conduct FCLP with anywhere from one to five aircraft in the pattern, based upon the number of aircraft available and whether the aircraft belong to fleet squadrons or the FRS. Under Alternative 1, both Scenarios 1 and 2 have been modeled for this noise analysis.

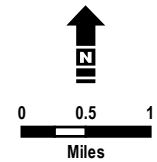


Path: L:\Buffalo\OLF_Alternative_Airfield\Maps\MXD\AUA_EA_Figures_All\June26_2012\Emporia POI.mxd

Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- ★ Point of Interest
- ▬ County Boundary
- ▬ Active Runway
- ▬ Interstate
- ▬ Emporia-Greenville Regional Airport
- ▬ Major Highway
- ▬ Local Street

Figure 3-9
Points of Interest
Emporia-Greenville Regional Airport



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Table 3-12 Modeled Sound Exposure Level for Points of Interest under Existing Conditions at Emporia-Greenville Regional Airport

			Existing Conditions		
			Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a		
Location ID	Description	Aircraft	Operation Type ^b	Distance from Aircraft ^c (miles)	SEL (dB)
	City of Emporia, Virginia				
CoE-1	Emmanuel Worship Center	MH-53	Box Pattern	0.43	90.3
CoE-2	Industrial Park	CH-47	Departure	0.48	85.4
CoE-3	Meherrin River Park Complex	MH-53	Box Pattern	0.50	85.0
CoE-4	Tall Oaks Residential Subdivision	MH-53	Box Pattern	0.68	83.6
CoE-5	Belfield-Emporia Historic District	MH-53	Box Pattern	0.93	81.4
CoE-6	Southern Virginia Regional Medical Center	MH-53	Box Pattern	1.31	79.0
CoE-7	City of Emporia Municipal Building	MH-53	Box Pattern	1.04	79.2
CoE-8	Hicksford-Emporia Historic District	MH-53	Box Pattern	1.05	79.4
CoE-9	Greenville High School	MH-53	Box Pattern	1.54	74.5
CoE-10	Interchange at Route 58/I-95	MH-53	Box Pattern	1.86	73.3
	Greenville County, Virginia				
GC-1	Intersection of Low Ground Road and Goose Pond Road	MH-53	Box Pattern	1.10	83.0
GC-2	Elnora Jarrell Worship Center	MH-53	Box Pattern	2.17	73.1
GC-3	Bryants Corner	MH-53	Box Pattern	0.84	84.1
GC-4	Union Grove Church of Christ	Business Jet	Departure	0.31	87.2
GC-5	Edward W. Wyatt Middle School	CH-47	Departure	1.19	77.9
GC-6	Greenville County Administration Offices	CH-47	Departure	0.55	85.4
GC-7	Emporia Country Club	Single Prop	Box Pattern	0.44	75.9
GC-8	Future Industrial Area No. 1	CH-47	Departure	1.60	76.2
GC-9	Greenville Correctional Center	CH-47	Arrival	4.20	64.8
GC-10	Intersection of State Route 611 and James River Junction	CH-47	Paratrooper Drops	0.29	87.7
GC-11	Oak Grove Baptist Church	Business Jet	Departure	0.13	110.0

Notes:

- For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.
- The Operation Type includes the following; Box Pattern = a pattern designed for repeated instrument approaches to the airfield, Departure = an aircraft flight track departing from the airfield, Arrival = an aircraft flight track arriving at the airfield, and Paratrooper Drops = helicopter operations typically flown vertically at different altitudes to provide paratrooper training.
- The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-12 Modeled Sound Exposure Level for Points of Interest under Existing Conditions at Emporia-Greenville Regional Airport

		Existing Conditions			
		Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a			
Location ID	Description	Aircraft	Operation Type ^b	Distance from Aircraft ^c (miles)	SEL (dB)
	Southampton County, Virginia				
SC-1	Mid-Atlantic Cotton Gin	Business Jet	Departure	0.18	94.7
SC-2	Intersection of Route 58 and State Route 711	Single Prop	Box Pattern	0.48	75.4
SC-3	Valley Proteins, Inc.	MH-53	Departure	3.17	66.4
SC-4	Intersection of Adams Grove Road and Railroad	MH-53	Departure	2.95	68.0
SC-5	Pleasant Grove Baptist Church	MH-53	Departure	3.53	65.1
SC-6	Capron Community Church of God	MH-53	Departure	3.67	64.7
SC-7	Deerfield Correctional Center	CH-47	Paratrooper Drops	12.39	38.4

Source: BRRC 2012

Notes:

- For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.
- The Operation Type includes the following; Box Pattern = a pattern designed for repeated instrument approaches to the airfield, Departure = an aircraft flight track departing from the airfield, Arrival = an aircraft flight track arriving at the airfield, and Paratrooper Drops = helicopter operations typically flown vertically at different altitudes to provide paratrooper training.
- The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-13 Modeled Annual Aircraft Operations under Alternative 1, Emporia-Greenville Regional Airport

	Departures	Arrivals	Pattern	Total
Civilian Fixed-Wing Aircraft				
Single Engine	243	243	486	972
Twin Engine	46	46	-	92
Business Jet	40	40	-	80
Subtotal Civilian Fixed-Wing Operations				1,144
Military Fixed-Wing Aircraft				
E-2/C-2	703	703	43,594	45,000
CASA 212	2	2	32	36
Subtotal Military Fixed-Wing Operations				45,036
Military Rotary-Wing Aircraft				
CH-47	220	220	580	1,020
MH-53	30	30	60	120
Subtotal Military Rotary-Wing Operations				1,140
Total				47,320

Source: BRRC 2012

Note: The aircraft in this table are described in Section 3.2.1.1.1.

3.5.2.2.1 Alternative 1, Scenario 1

The modeled Alternative 1, Scenario 1 (assuming a three-plane pattern) noise contours are shown on Figure 3-10 (the baseline noise contour is also included for comparison). The noise contours for Alternative 1, Scenario 1, extend into Greenville County to the north and Southampton County to the south. The noise contours do not extend into the City of Emporia. Table 3-14 shows the estimated number of acres within the modeled Alternative 1, Scenario 1, noise contours (excluding airfield property). Existing noise contours at Emporia-Greenville were within the airport boundary, while the noise contours for Alternative 1, Scenario 1, cover 40.5 acres outside the airport boundary. The majority of the land area under the noise contours (67.4 percent) falls within Greenville County, with the balance extending into Southampton County.

Table 3-14 also presents the number of housing units and the estimated number of people within the modeled Alternative 1, Scenario 1, noise zones by municipality. The estimated population within the 65 to 70 dB DNL noise zone was calculated using the average household size for Greenville County recorded in the 2010 U.S. Census of 2.44 people (and rounding up). Existing noise contours are within the airport boundary; therefore, they do not encompass housing units or population.

Table 3-14 Land Area, Housing Units, and Estimated Number of People within Projected Noise Zones under Alternative 1, Scenario 1, at Emporia-Greenville Regional Airport

Noise Zone (dB DNL) ¹	Existing Conditions			Projected Conditions ³		
	Land Area (Acres)	Housing Units	Estimated Population ²	Land Area (Acres)	Housing Units	Estimated Population ²
Southampton County						
65 to 70	0	0	0	13.2 (+13.2)	0 (0)	0 (0)
70 to 75	0	0	0	0 (0)	0 (0)	0 (0)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Sub-Total	0	0	0	13.2 (+13.2)	0 (0)	0 (0)
Greenville County						
65 to 70	0	0	0	27.3 (+27.3)	1 (+1)	3 (+3)
70 to 75	0	0	0	0 (0)	0 (0)	0 (0)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Sub-total	0	0	0	27.3 (+27.3)	1 (+1)	3 (+3)
Grand Total	0	0	0	40.5 (+40.5)	1 (+1)	3 (+3)

Note:

¹ The modeled noise contours do not extend into the City of Emporia; thus, the City of Emporia was not included in the table.

² During land surveys conducted in July 2011, the Navy, with the aid of GIS features, recorded the locations of residential properties within the vicinity of the Emporia-Greenville Regional Airport. Population was then estimated based on an average of 2.44 people per household, which is the average number of people per household for Greenville County (where the housing units located), based on 2010 U.S. Census data.

³ The changes in acres, housing units, and estimated population between the existing and projected conditions are noted in parentheses.

The FAA is a cooperating agency in the evaluation of Alternative 1 and the proposed airport design changes to the Emporia-Greenville Regional Airport. FAA policy, as outlined in Chapter 17 – Noise of the FAA’s Environmental Desk Reference for Airport Actions, designates the DNL 65 dB noise contour as the recommended noise contour above which residential land uses are not considered compatible. Incorporation or installation of sound-proofing building materials into homes may aid toward reducing the interior noise environment. A copy of FAA’s Environmental Desk Reference for Airport Actions is available at http://www.faa.gov/airports/environmental/environmental_desk_ref/.

Based on a current survey, there appears to be one residence within the greater than 65 dB DNL noise zone. The presence of one house within the greater than 65 dB DNL noise zone would not require mitigation based on Navy standards because it does not present a significant impact. Nevertheless, FAA regulations consider a residence within the 65 dB DNL noise contour to be incompatible and would require the potential impact to be mitigated. Prior to taking action, the FAA requires the land use designation for this property be changed to reflect a non-residential status, and the Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use if Emporia-Greenville is the chosen alternative for the proposed action.

In addition, one religious facility (Oak Grove Church in Greenville County) would be within the 65 dB DNL noise contour and is currently under reconstruction and not holding services. There are no schools, day care centers, or hospitals located within the 65 dB DNL or greater noise zone. The greater than 70 dB DNL noise zone would be wholly contained within the Emporia-Greenville airport property.

3.5.2.2.2 Alternative 1, Scenario 2

The modeled Alternative 1, Scenario 2 (assuming both a three- and five-plane pattern), noise contours are shown on Figure 3-11 (the baseline noise contour is also included for comparison). The noise contours for Alternative 1, Scenario 2, extend into Greenville County to the north and Southampton County to the south. The noise contours do not extend into the City of Emporia. Table 3-15 shows the estimated number of acres within the modeled Alternative 1, Scenario 2, noise contours (excluding airfield property). Existing noise contours at Emporia-Greenville were within the airport boundary, while the noise contours for Alternative 1, Scenario 2, would cover 44.0 acres outside the airport boundary. The majority of the land area under the noise zones (64.3 percent) falls within Greenville County, with the balance extending into Southampton County.



Source: ESRI 2010

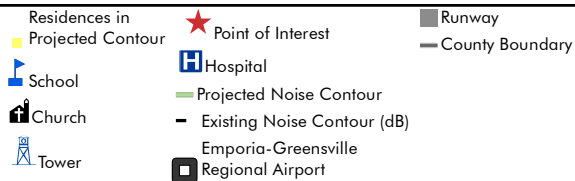


Figure 3-11
Modeled Projected Noise Contours with Residences
Alternative 1 Scenario 2
 Emporia-Greenville Regional Airport

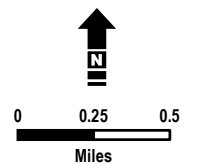


Table 3-15 Land Area, Housing Units, and Estimated Number of People within Projected Noise Zones under Alternative 1, Scenario 2, at Emporia-Greenville Regional Airport

Noise Zone (dB DNL) ¹	Existing Conditions			Projected Conditions ³		
	Land Area (Acres)	Housing Units	Estimated Population ²	Land Area (Acres)	Housing Units	Estimated Population ²
Southampton County						
65 to 70	0	0	0	15.7 (+15.7)	0 (0)	0 (0)
70 to 75	0	0	0	0 (0)	0 (0)	0 (0)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Sub-Total	0	0	0	15.7 (+15.7)	0 (0)	0 (0)
Greenville County						
65 to 70	0	0	0	28.3 (+28.3)	1 (+1)	3 (+3)
70 to 75	0	0	0	0 (0)	0 (0)	0 (0)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Sub-total	0	0	0	28.3 (+28.3)	1 (+1)	3 (+3)
Grand Total	0	0	0	44.0 (+44.0)	1 (+1)	3 (+3)

Note:

¹ The modeled noise contours do not extend into the City of Emporia; thus, the City of Emporia was not included in the table.

² During land surveys conducted in July 2011, the Navy, with the aid of GIS features, recorded the locations of residential properties within the vicinity of the Emporia-Greenville Regional Airport. Population was then estimated based on an average of 2.44 people per household, which is the average number of people per household for Greenville County (where the housing unit is located), based on 2010 U.S. Census data.

³ The changes in acres, housing units, and estimated population between the existing and projected conditions are noted in parentheses.

Table 3-15 also presents the number of housing units and the estimated number of people within the modeled Alternative 1, Scenario 2, noise zones, by municipality. The 65 dB DNL or greater noise contour for Scenario 2 impacts the same house and religious facility as in Scenario 1. The presence of one house within the greater than 65 dB DNL noise zone would not require mitigation based on Navy standards because it does not present a significant impact. Nevertheless, FAA regulations consider a residence within the 65 dB DNL noise contour to be incompatible and would require the potential impact to be mitigated. Prior to taking action, the FAA requires the land use designation for this property be changed to reflect a non-residential status, and the Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use if Emporia-Greenville is the chosen alternative for the proposed action.

There are no additional houses, schools, day care centers, or hospitals located within the 65 dB DNL or greater noise zone under Scenario 2.

3.5.2.3 Sound Exposure Level and Points of Interest

The points of interest identified by the City of Emporia, Greenville County, Southampton County, and the Navy are shown on Figure 3-9. The SEL values would differ slightly from Alternative 1, Scenario 1, to Alternative 1, Scenario 2, due to the different flight tracks that would be flown and the different distance between the aircraft and the point of interest.

3.5.2.3.1 Alternative 1, Scenarios 1 and 2

Points of interest that fall within or near the Alternative 1, Scenarios 1 and 2, noise contours are also depicted on Figure 3-10 (see Section 3.5.2. for a description and figure showing all points of interest). Table 3-16 presents the maximum modeled SEL value for projected Navy E-2/C-2 operations at Emporia-Greenville under Alternative 1, Scenarios 1 and 2. The maximum modeled SEL values for the existing environment are also repeated in Table 3-16 for comparison to the projected environment.

The E-2/C-2 operation type and distance of the point of interest from the aircraft, along with the modeled SEL value for that point of interest for Alternative 1, Scenarios 1 and 2, are provided. Each Location ID presented in the table corresponds to a point of interest depicted on Figure 3-9 (and Figure 3-10, if applicable).

For the projected environment, the E-2/C-2 operations that generated the maximum modeled SEL values were primarily crew swap operations. This is due to the fact that the E-2/C-2 would fly closer to many of the points of interest that are farther from the airfield when conducting a crew swap. Departures, arrivals, and an FCLP operation also have the maximum modeled SEL value for select points of interest. SEL values for Alternative 1, Scenarios 1 and 2, ranged from a low of 66.8 dB SEL to a high of 98.5 dB SEL.

Examining the data provided in Table 3-16 shows that E-2/C-2 aircraft operating at Emporia-Greenville would result in a higher maximum modeled SEL value for less than half of the points of interest. The difference in the SEL values from existing conditions to the projected environment varied based upon the distance between the point of interest and the aircraft type/operation.

3.5.2.4 Noise Impact Conclusion

Response to noise is subjective because individuals perceive noise impacts differently. To explain the impacts of noise on the environment and resources analyzed, the subjectivity of noise must be removed. To remove the subjectivity, the Navy applies a scientifically based, and DOD approved, modeling analysis to quantify noise impacts. The two metrics presented in this noise analysis section (DNL and SEL) provide two different approaches to quantifying noise impacts based on average noise exposure and single-event noise exposures. DNL is the accepted metric for measuring community reaction to noise; however, SEL provides a supplemental metric for describing noise from a single event.

For the DNL analysis, the proposed Navy E-2/C-2 operations would increase the land area experiencing greater than 65 dB DNL by approximately 40.5 and 44.0 acres for Scenarios 1 and 2, respectively, and the greater than 70 dB DNL noise zone would be wholly contained within the Emporia-Greenville airport property. In both cases, the noise would impact approximately three individuals who were previously not within the greater than 65 dB DNL noise contour, all of whom reside in Greenville County. Based upon the number of people in Greenville

Table 3-16 Modeled Sound Exposure Level for Points of Interest under Alternative 1, Scenario 1 and Scenario 2, at Emporia-Greenville Regional Airport

Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a						Alternative 1, Scenario 1 Three-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 1, Scenario 2 Three- and Five-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
Location ID	Description	Aircraft	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)
City of Emporia, Virginia											
CoE-1	Emmanuel Worship Center	MH-53	Box Pattern	0.43	90.3	Departure	0.36	89.5	Departure	0.36	89.5
CoE-2	Industrial Park	CH-47	Departure	0.48	85.4	Crew Swap	0.73	84.3	FCLP	0.46	85.0
CoE-3	Meherrin River Park Complex	MH-53	Box Pattern	0.50	85.0	Departure	1.29	77.9	Departure	1.29	77.9
CoE-4	Tall Oaks Residential Subdivision	MH-53	Box Pattern	0.68	83.6	Departure	1.54	75.9	Departure	1.54	75.9
CoE-5	Belfield-Emporia Historic District	MH-53	Box Pattern	0.93	81.4	Departure	1.57	75.6	FCLP	1.07	76.5
CoE-6	Southern Virginia Regional Medical Center	MH-53	Box Pattern	1.31	79.0	Crew Swap	1.90	74.5	FCLP	0.93	77.4
CoE-7	City of Emporia Municipal Building	MH-53	Box Pattern	1.04	79.2	Departure	1.83	73.9	Departure	1.83	73.9
CoE-8	Hicksford-Emporia Historic District	MH-53	Box Pattern	1.05	79.4	Departure	1.88	73.5	Departure	1.88	73.5
CoE-9	Greenville High School	MH-53	Box Pattern	1.54	74.5	Departure	2.46	70.5	Departure	2.46	70.5
CoE-10	Interchange at Route 58/I-95	MH-53	Box Pattern	1.86	73.3	Crew Swap	2.52	71.9	FCLP	1.29	73.7

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.^c The Operation Type includes the following; Box Pattern = a pattern designed for repeated instrument approaches to the airfield, Departure = an aircraft flight track departing from the airfield, Arrival = an aircraft flight track arriving at the airfield, and Paratrooper Drops = helicopter operations typically flown vertically at different altitudes to provide paratrooper training.^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-16 Modeled Sound Exposure Level for Points of Interest under Alternative 1, Scenario 1 and Scenario 2, at Emporia-Greenville Regional Airport

Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a						Alternative 1, Scenario 1 Three-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 1, Scenario 2 Three- and Five-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
Location ID	Description	Aircraft	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)
Greenville County, Virginia											
GC-1	Intersection of Low Ground Road and Goose Pond Road	MH-53	Box Pattern	1.10	83.0	Departure	1.28	76.6	Departure	1.28	76.6
GC-2	Elnora Jarrell Worship Center	MH-53	Box Pattern	2.17	73.1	Departure	3.14	67.3	Departure	3.14	67.3
GC-3	Bryants Corner	MH-53	Box Pattern	0.84	84.1	Departure	1.77	75.1	Departure	1.77	75.1
GC-4	Union Grove Church of Christ	Business Jet	Departure	0.31	87.2	Crew Swap	0.35	90.3	Crew Swap	0.35	90.3
GC-5	Edward W. Wyatt Middle School	CH-47	Departure	1.19	77.9	Crew Swap	1.53	77.5	FCLP	0.15	91.0
GC-6	Greenville County Administration Offices	CH-47	Departure	0.55	85.4	Arrival	0.29	85.2	Arrival	0.29	85.2
GC-7	Emporia Country Club	Single Prop	Box Pattern	0.44	75.9	Arrival	0.16	89.8	Arrival	0.16	89.8
GC-8	Future Industrial Area No. 1	CH-47	Departure	1.60	76.2	Crew Swap	2.36	72.1	Crew Swap	2.36	72.1
GC-9	Greenville Correctional Center	CH-47	Arrival	4.20	64.8	Crew Swap	3.30	66.9	Crew Swap	3.30	66.9
GC-10	Intersection of State Route 611 and James River Junction	CH-47	Paratrooper Drops	0.29	87.7	FCLP	0.27	85.6	FCLP	0.27	85.6
GC-11	Oak Grove Baptist Church	Business Jet	Departure	0.13	110.0	Crew Swap	0.12	98.5	Crew Swap	0.12	98.5

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^c The Operation Type includes the following; Box Pattern = a pattern designed for repeated instrument approaches to the airfield, Departure = an aircraft flight track departing from the airfield, Arrival = an aircraft flight track arriving at the airfield, and Paratrooper Drops = helicopter operations typically flown vertically at different altitudes to provide paratrooper training.

^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-16 Modeled Sound Exposure Level for Points of Interest under Alternative 1, Scenario 1 and Scenario 2, at Emporia-Greensville Regional Airport

Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a						Alternative 1, Scenario 1 Three-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 1, Scenario 2 Three- and Five-Plane Scheme E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
Location ID	Description	Aircraft	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)	Operation Type ^c	Dist. from Aircraft ^d	SEL (dB)
Southampton County, Virginia											
SC-1	Mid-Atlantic Cotton Gin	Business Jet	Departure	0.18	94.7	Crew Swap	0.19	95.4	Crew Swap	0.19	95.4
SC-2	Intersection of Route 58 and State Route 711	Single Prop	Box Pattern	0.48	75.4	Crew Swap	1.12	80.3	FCLP	0.68	80.3
SC-3	Valley Proteins, Inc.	MH-53	Departure	3.17	66.4	Crew Swap	0.67	83.8	Crew Swap	0.67	83.8
SC-4	Intersection of Adams Grove Road and Railroad	MH-53	Departure	2.95	68.0	Crew Swap	0.42	83.6	Crew Swap	0.42	83.6
SC-5	Pleasant Grove Baptist Church	MH-53	Departure	3.53	65.1	Crew Swap	0.56	81.9	Crew Swap	0.56	81.9
SC-6	Capron Community Church of God	MH-53	Departure	3.67	64.7	Crew Swap	0.57	81.0	Crew Swap	0.57	81.0
SC-7	Deerfield Correctional Center	CH-47	Paratrooper Drops	12.39	38.4	Crew Swap	1.81	66.8	Departure	1.81	66.8

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.^c The Operation Type includes the following; Box Pattern = a pattern designed for repeated instrument approaches to the airfield, Departure = an aircraft flight track departing from the airfield, Arrival = an aircraft flight track arriving at the airfield, and Paratrooper Drops = helicopter operations typically flown vertically at different altitudes to provide paratrooper training.^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

County in 2010 (12,243), this action would impact approximately 0.02 percent of the total population. In addition, as noted previously, given Emporia-Greenville's location along U.S. Route 58, truck traffic would also be present in the vicinity of the airport. Therefore, the average noise level experienced by those living in the vicinity of the airport may be a result of both aircraft activities at the airfield and vehicular traffic along these roadways.

With regard to potential hearing loss, the criterion is for a population to be exposed to DNL greater than or equal to 80 dB DNL (DOD 2009). The noise generated by either Scenario 1 or 2 does not reach 80 dB DNL, even within the airport property. As a result, there would not be a significant risk for potential loss of hearing associated with the Navy's proposed action at Emporia-Greenville. For clarification purposes, the proposed action does generate SEL values higher than 80 dB; however, the criterion for hearing loss is analyzed in DNL, the accepted metric for assessing potential long-term hearing loss, and the DNL analysis for the proposed action indicates there would not be a significant risk for hearing loss.

For the SEL analysis examining noise experienced at the points of interest from single aircraft events, there are some operations related to the Navy's proposed action that would result in a higher modeled SEL value at that point. These primarily related to crew swap operations, which represent a small portion of the overall E-2/C-2 operations under the Navy's proposed action (only 11 percent of the total operations). Crew swap operations resulted in higher modeled SEL values due to the fact that the crew swap flight track extends farther from the airfield (and extends closer to specific points of interest) than many of the current operations. Despite there being an increase in the modeled SEL for a given point, the majority of the points of interest are outside of the 65 dB DNL noise metric. This means individuals at these points may experience single-event noise that occasionally exceeds that present under existing conditions, but, overall, they would not experience a high level of average noise (measured in DNL). The majority of the aircraft operations would be FCLP, which are captured in the annual average noise contours.

Although noise levels would increase at Emporia-Greenville under Alternative 1, the overall change in the noise environment under Scenarios 1 and 2 would result in only three additional individuals—0.02 percent of the total county population—residing within the new 65 dB DNL noise contour, which is not considered a significant impact by Navy standards. If this alternative is chosen, the Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert it to non-residential use. In addition, although some of the maximum modeled SEL values at points of interest were higher than under existing conditions, the aircraft operations would be temporary and intermittent in nature. Therefore, there would be no significant impact from noise as a result of the Navy's implementation of Alternative 1 for either Scenario 1 or 2.

3.5.3 Existing Noise at Wallops Flight Facility

The study area for noise at WFF Main Base consists of the area within the modeled 65 dB DNL and greater noise zone.

NOISEMAP is used to model noise from fixed-wing aircraft, including the P-3, the Beechcraft Super King Air, the FA-18E/F, the existing E-2 and C-2 operations, the A-10, and the C-40. These are the most frequent and/or loudest aircraft using WFF Main Base, and they determine the noise contours at the airfield. Because the number of rotary-wing aircraft operating at WFF Main Base is minimal and would not increase the size of existing noise contours, the Rotorcraft Noise Model was not used.

WFF Main Base is owned and operated by NASA and hosts approximately 13,000 annual operations, of which approximately 12,500 are military (primarily Navy) and 500 are civilian (primarily NASA). A total of up to 11 aircraft are based at the airport: 10 fixed-wing aircraft (seven multi-engine aircraft, one single engine aircraft, and two jet aircraft) and one rotary-wing aircraft (NASA Wallops Flight Facility Aircraft Office 2012).

The annual operations at WFF Main Base used to develop the existing noise contours are listed in Table 3-17. All existing operations were modeled as acoustic day operations, as normal operating hours for the airfield are from 7 a.m. to 5 p.m. The existing runway utilization modeled was 65 percent of the total operations on Runway 10/28 (with 40 percent of those on Runway 10 and 60 percent on Runway 28) and 35 percent Runway 04/22 (with 30 percent on Runway 04 and 70 percent on Runway 22). Therefore, using the percentages noted by individual runway, the composite runway utilization modeled for the four runways was 11 percent for Runway 04, 24 percent for Runway 22, 26 percent for Runway 10, and 39 percent for Runway 28 (BRRC 2012).

Table 3-17 Existing Annual Operations, Wallops Flight Facility Main Base

	Departures	Arrivals	Pattern	Total
Civilian Aircraft				
NASA (P-3, Super King Air)	157	156	-	313
Misc.	94	94	-	188
Subtotal Civilian Operations				501
Military Aircraft				
U.S. Navy (FA-18, E-2/C-2)	789	789	9,471	11,049
Maryland Air National Guard (A-10)	55	55	662	772
U.S. Air Force (C-40)	48	48	574	670
Army and Coast Guard	41	41	-	82
Subtotal Military Operations				12,573
Total				13,074

Source: BRRC 2012

3.5.3.1 Day-Night Average Sound Level Analysis

The existing noise contours modeled for WFF Main Base are entirely located in Accomack County, Virginia (see Figure 3-12). The existing noise zone that is 65 dB DNL or greater covers approximately 599.8 acres outside of the WFF Main Base property boundary. Details on the land uses within these areas are presented in Section 3.6.3. The residences shown in Figure 3-12 are those that are within the existing noise contours and off of the WFF Main Base property.

Table 3-18 shows the estimated number of acres outside of WFF Main Base that contain the existing noise contours, as well as an estimate on the number of people and housing units within the existing noise contours. In total, an estimated 430 housing units and 1,019 residents are located within the existing noise zones. No residences are within a noise zone greater than 75 dB DNL as those noise contours do not extend outside of the WFF Main Base property boundary. Also, no schools/day care centers, religious facilities, or hospitals are located within the existing noise zones.

Table 3-18 Total Acres, Population, and Housing Units within Modeled Existing Noise Zones at Wallops Flight Facility Main Base

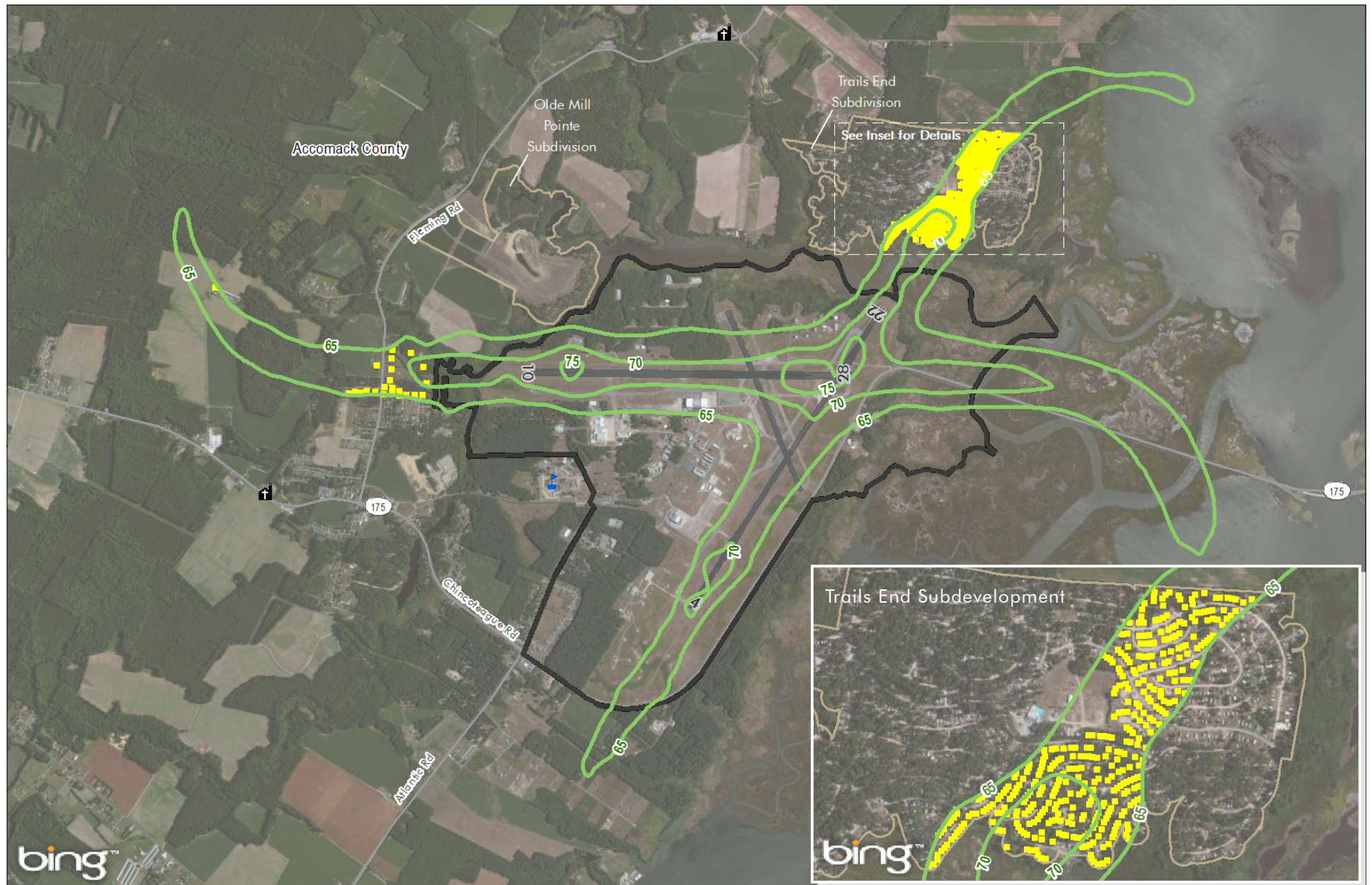
Noise Zones (dB DNL)	Total (acres) ¹	Estimated Population ²	Housing Units
65 to 70	536.2	834	352
70 to 75	63.6	185	78
Greater than 75	0	0	0
Total	599.8	1,019	430

Note:

¹ Does not include acreage on WFF Main Base.

² During land surveys conducted in Winter 2012 and through aerial imagery analysis, the Navy recorded the locations of residential properties within the noise contours at WFF Main Base. Population was then estimated based on an average of 2.37 people per household, which is the average number of people per household for Accomack County, based on the 2010 Census.

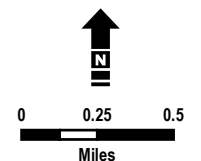
In addition to noise generated by aircraft operating at WFF Main Base, there are several other sources of noise in the communities surrounding the WFF properties. These sources include the launching of rockets from the Wallops Island property (launch facilities are located approximately 6 miles from the southern boundary of WFF Main Base), as well as car and truck traffic along U.S. Route 13 and Virginia Route 175. However, noise generated from rocket launches and vehicle traffic was not modeled as part of this analysis. Rocket launches do not occur on a frequent basis, and different metrics are used for measuring the noise from those events. In addition, vehicle traffic is sporadic and seasonal and was not incorporated even though it is part of the overall noise environment at WFF Main Base.



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Residences in Existing Contour
- School
- Church
- Existing Noise Contour (dB)
- Active Runway
- Wallops Flight Facility
- Major Highway
- Local Street

Figure 3-12
Modeled Existing Noise Contours
 Wallops Flight Facility



3.5.3.2 Sound Exposure Level Analysis

As part of the noise analysis, the Navy modeled the SEL at specific points of interest identified through coordination with Accomack County representatives, NASA, the USFWS, and the Navy. These locations include residential areas, schools, religious facilities, and other locations where noise could be a concern or general locations (i.e., intersections) that are geographically dispersed. Twenty-two points of interest were identified. This noise analysis presents the maximum modeled SEL value for each specific point of interest for aircraft operations currently at WFF Main Base.

The points of interest identified by Accomack County are shown on Figure 3-13 along with the modeled existing noise contours. Table 3-19 presents the description of the aircraft, operation type, distance to the aircraft, and the modeled SEL value for each point of interest. The Location ID presented in Table 3-19 corresponds to a point of interest depicted on Figure 3-13.

The maximum modeled SEL values under existing conditions at WFF Main Base are dominated by jet fighter operations (i.e., FA-18). The SEL values range from a low of 75.0 dB SEL to a high of 117.2 dB SEL. It should be noted that potential hearing loss is measured using the average noise metric, DNL, not SEL.

3.5.4 Noise Impacts at Wallops Flight Facility

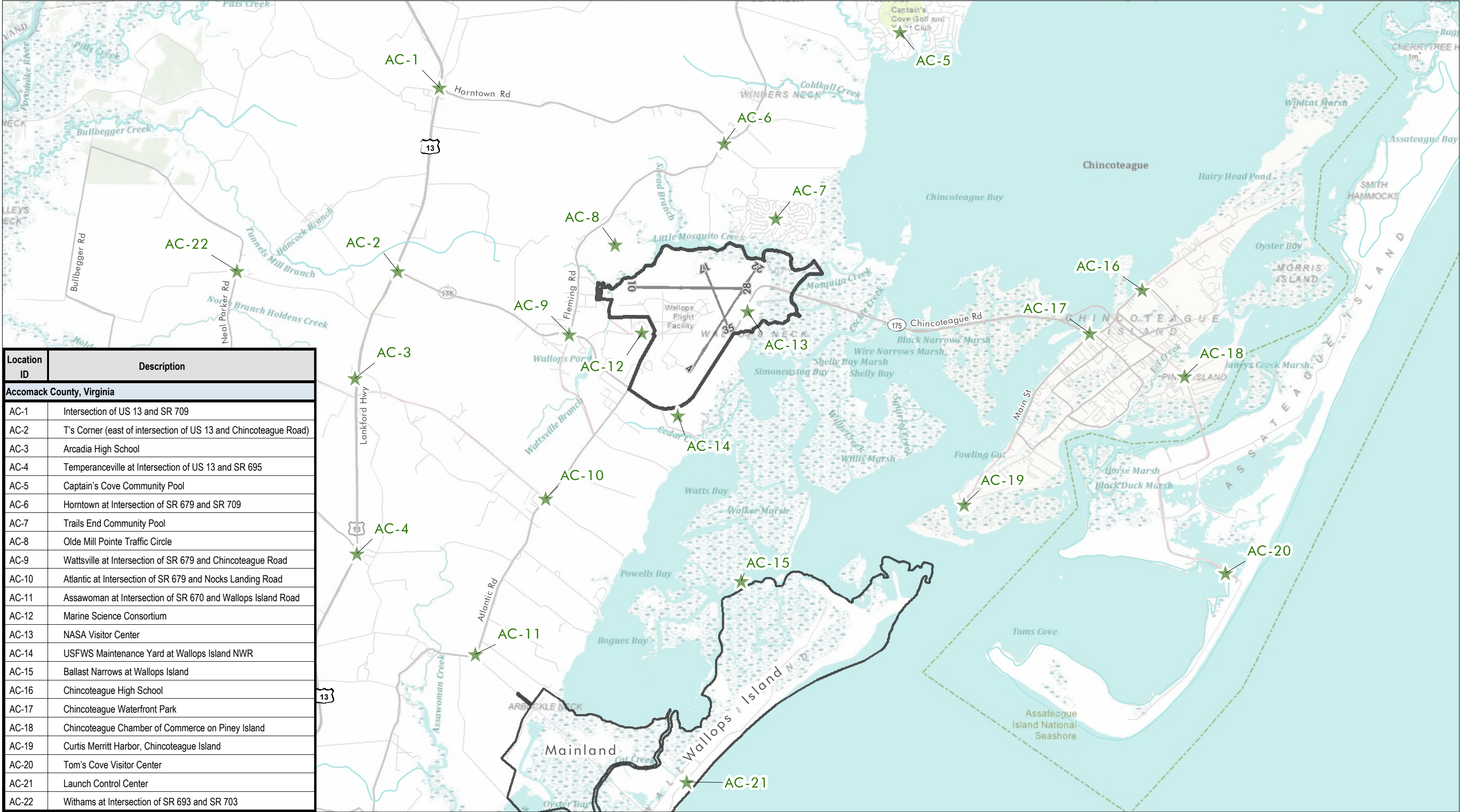
3.5.4.1 Proposed Aircraft Operations

Under Alternative 2, the Navy would conduct up to 45,000 E-2/C-2 operations annually at WFF Main Base. The number of existing civilian and military operations at WFF Main Base is not expected to change and would continue to operate, as was outlined in Section 3.2.3.1. The existing aircraft operations are included in the projected noise contours. The projected annual operations under Alternative 2 are listed in Table 3-20. Because existing operations are expected to remain the same, the table is similar to Table 3-13 but with the addition of the Navy's E-2/C-2 operations. These aircraft operations were modeled using NOISEMAP to determine noise impacts at WFF Main Base.

Approximately half of the proposed Navy E-2/C-2 training under Alternative 2 would be conducted during daylight hours and half during hours of darkness. For purposes of FCLP, training during darkness begins one-half hour after sunset. A training period could last up to approximately three hours and would end as soon as possible. Because sunset occurs later during the long daylight hours of the summer months, FCLP that begins after sunset may continue as late as 1:00 a.m., or later.

As described in Section 3.5, acoustic night is a noise analysis term. Operations during acoustic night (defined as between the hours of 10:00 p.m. and 7:00 a.m.) are "penalized" by adding 10 dB to account for the lower background sound levels and greater community sensitivity to noise during late-night or early morning hours. In order to minimize noise impacts to the community to the greatest extent feasible, the Navy attempts to end flight operations before 10:00 p.m. whenever possible.

Path: L:\Buffalo\OLF_Alternative_Airfield\Map\Map\Wallops_Island\EA_Figures\Jan17_2012\Wallops_POI.mxd



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- ★

Point of Interest
- Active Runway
- Wallops Flight Facility
- Major Highway
- Local Street

Figure 3-13
Points of Interest
Wallops Flight Facility



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Table 3-19 Modeled Sound Exposure Level for Points of Interest under Existing Conditions at Wallops Flight Facility Main Base

Location ID	Description	Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a			
		Aircraft	Operation Type ^b	Distance from Aircraft ^c	SEL (dB)
AC-1	Intersection of US 13 and SR 709	Jet Fighter	Arrival	1.76	88.9
AC-2	T's Corner (east of intersection of US 13 and Chincoteague Road)	Jet Fighter	Departure	0.60	105.6
AC-3	Arcadia High School	Jet Fighter	Departure	1.40	95.3
AC-4	Temperanceville at Intersection of US 13 and SR 695	Jet Fighter	Departure	1.59	92.8
AC-5	Captain's Cove Community Pool	Jet Fighter	Departure	0.77	101.8
AC-6	Horntown at Intersection of SR 679 and SR 709	Jet Fighter	Touch and Go	0.40	106.2
AC-7	Trails End Campground Community Pool	Jet Fighter	Arrival	0.13	116.0
AC-8	Olde Mill Pointe Traffic Circle	Jet Fighter	Touch and Go	0.27	110.4
AC-9	Wattsville at Intersection of SR 679 and Chincoteague Road	Jet Fighter	Arrival	0.20	112.7
AC-10	Atlantic at Intersection of SR 679 and Nocks Landing Road	Jet Fighter	Departure	0.68	104.2
AC-11	Assawoman at Intersection of SR 670 and Wallops Island Road	Jet Fighter	Departure	1.87	89.4
AC-12	Marine Science Consortium	Jet Fighter	Departure	0.59	105.8
AC-13	NASA Visitor Center	Jet Fighter	Departure	0.24	117.2
AC-14	USFWS Maintenance Yard at Wallops Island National Wildlife Refuge	Jet Fighter	Arrival	0.17	113.7
AC-15	Wallops Island	Jet Fighter	Departure	2.04	89.4
AC-16	Chincoteague High School	Jet Fighter	Arrival	0.27	91.2
AC-17	Chincoteague Waterfront Park	Jet Fighter	Departure	1.97	89.9
AC-18	Chincoteague Chamber of Commerce on Piney Island	Jet Fighter	Departure	3.25	82.6
AC-19	Curtis Merritt Harbor, Chincoteague Island	Jet Fighter	Arrival	2.14	87.5
AC-20	Tom's Cove Visitor Center	Jet Fighter	Arrival	3.63	75.0
AC-21	Mid-Atlantic Regional Spaceport	Jet Fighter	Departure	3.67	83.1
AC-22	Withams at Intersection of SR 693 and SR 703	Jet Fighter	Departure	1.04	98.6

Source: BRRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^b The Operation Type includes the following: Arrival = an aircraft flight track arriving at the airfield, Departure = an aircraft flight track departing from the airfield, and Touch and Go = a pattern flown by an aircraft where it approaches the airfield and touches down on the runway and then accelerates, performing a takeoff without coming to a full stop.

^c The Distance to Aircraft is the diagonal distance, in miles, from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-20 Modeled Annual Aircraft Operations under Alternative 2, Wallops Flight Facility Main Base

	Departures	Arrivals	Pattern	Total
Civilian Aircraft				
NASA	157	157	-	314
Misc.	94	94	-	188
Subtotal Civilian Operations				502
Military Aircraft				
U.S. Navy (existing)	789	789	9,471	11,049
U.S. Navy E-2/C-2 (new)	703	703	43,594	45,000
Maryland Air National Guard	55	55	662	772
U.S. Air Force	48	48	574	670
Army and Coast Guard	41	41	-	82
Subtotal Military Operations				57,573
Total				58,075

Source: BRRC 2012

Note: The types of aircraft operations in this table are described in Section 3.2.3.1.

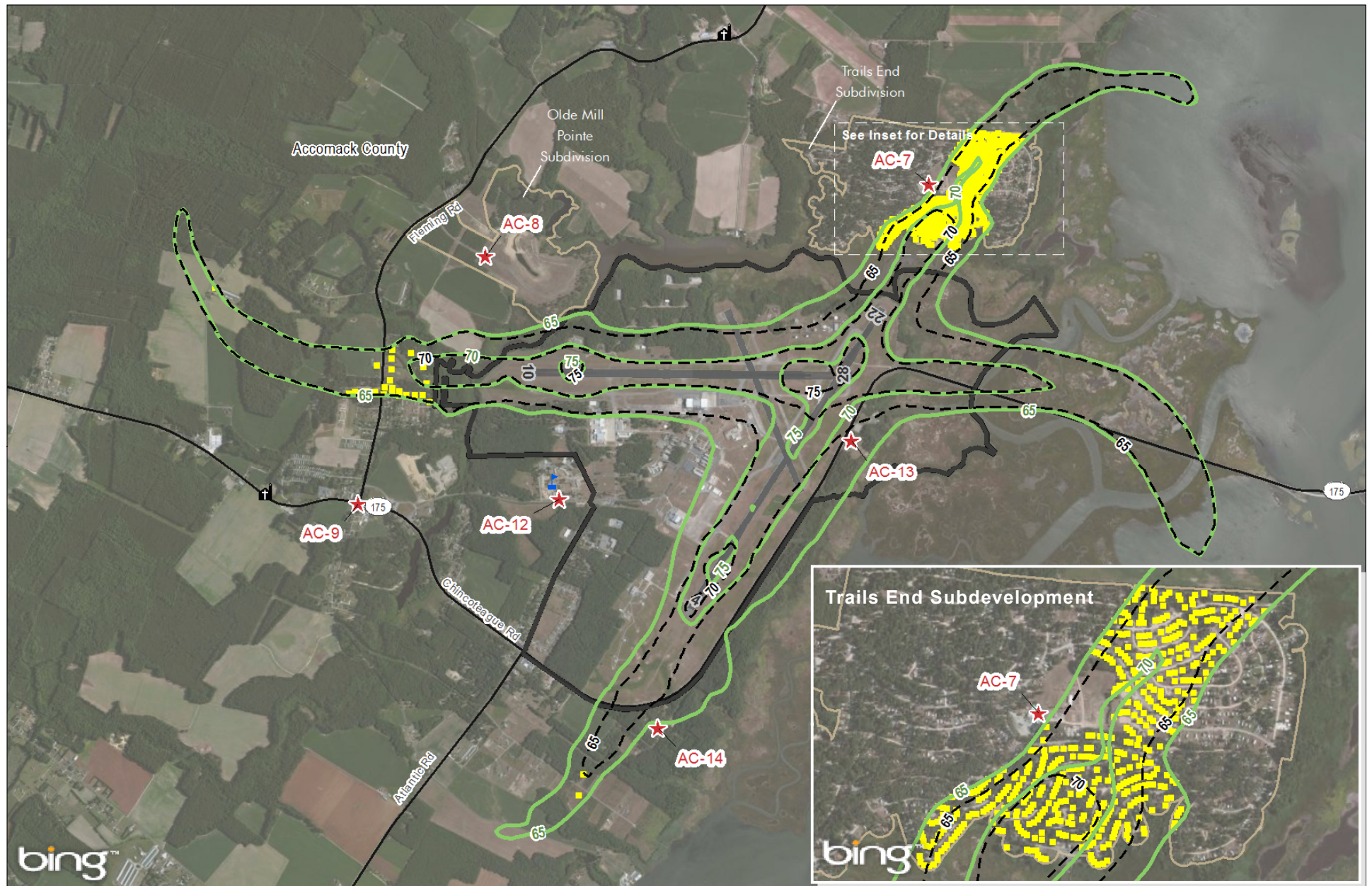
3.5.4.2 Day-Night Average Sound Level Analysis

The Navy's E-2/C-2 aircraft could conduct FCLP on either Runway 04/22 or Runway 10/28. Under Alternative 2, these are defined as Scenario 1, where the Navy aircraft conducting FCLP would operate using Runway 04/22, and Scenario 2, where the Navy aircraft conducting FCLP would operate using Runway 10/28. Both of these scenarios have been modeled for this noise analysis.

3.5.4.2.1 Alternative 2, Scenario 1

The modeled Alternative 2, Scenario 1, noise contours at WFF Main Base are shown on Figure 3-14 (the baseline noise contour is also included for comparison). All of the noise contours are contained within Accomack County, Virginia and, compared to the existing noise contours at WFF Main Base, the contours for the proposed action are slightly elongated along Runway 04/22. Table 3-21 shows the estimated number of acres within the modeled Alternative 2, Scenario 1, noise contours (excluding airfield property and including land area only). Existing noise contours encompass approximately 599.8 acres, not including WFF Main Base property (see Section 3.5.3), while the projected noise contours for Alternative 2, Scenario 1, on Runway 04/22 encompass approximately 808.5 acres, an increase of 208.7 acres.

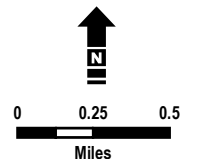
Table 3-21 also presents the estimated number of housing units (residential or seasonal campground) and the estimated number of people within the modeled Alternative 2, Scenario 1, noise zones. The estimated population within the 65 to 70 dB DNL and 70 to 75 dB DNL noise zones was calculated using the average household size for Accomack County, recorded in the 2010 U.S. Census, of 2.37 people (and rounding up). Existing noise contours extend off WFF Main Base property (as discussed in Section 3.5.3) and are also presented in Table 3-21 for comparison. As noted in Section 1.4.1.2, during the incorporation of noise contour changes related to the revised holding pattern location and altitude



Source: ESRI 2010.

- | | | |
|-----------------------------------|----------------------------------|----------------------------|
| Residence in
Projected Contour | ★ Point of Interest | Wallops Flight
Facility |
| School | — Noise Contour (dB) | — Major Highway |
| Church | — Existing Noise
Contour (dB) | — Local Street |
| Hospital | ■ Active Runway | |

Figure 3-14
Modeled Projected Noise Contours with Residences
Alternative 2 Scenario 1
 Wallops Flight Facility



conducted between the Draft EA and the Final EA, additional Trails End Campground properties within the greater than 65 dB DNL noise zone for Alternative 2 were identified. Table 3-21 presents the revised estimate for the number of properties and residences and estimated population within the Alternative 2, Scenario 1, noise zones. Under implementation of Alternative 2, Scenario 1, there would be an estimated increase of 113 housing units and 268 individuals within the 65 dB DNL and above noise zone. The additional people within the noise zones in Accomack County represent approximately 0.08 percent of the total population. Of this total, 83 of the individuals, which represents 0.3 percent of the total county population, would be in the 70 to 75 dB DNL noise zone.

The majority of individuals who would be impacted by the increase in noise under Alternative 2, Scenario 1, would be in the Trails End community. Trails End is a private waterfront campground resort, zoned for agricultural use, that was built near the end of the WFF Main Base pre-existing active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. The increase in noise would also be temporary and intermittent, and the aircraft operations generating the noise would be consistent with the existing operations at WFF.

Trails End owners are primarily “weekenders” who visit the community on weekends year-round and during vacations. The Trails End community association considers 300 of the 2,500 lots to be occupied full time. Accomack County has zoned the land that Trails End occupies as agricultural, not residential (Accomack County 2012).

There are no religious facilities, schools, day care centers, or hospitals within the greater than 65 dB DNL noise zone.

3.5.4.2.2 Alternative 2, Scenario 2

The modeled Alternative 2, Scenario 2, noise contours at WFF Main Base are shown on Figure 3-15 (the baseline noise contour is also included for comparison). All of the noise contours are contained within Accomack County, Virginia. Compared to the existing noise contours at WFF Main Base, the contours for the proposed action are slightly elongated along Runway 10/28. Table 3-22 shows the estimated number of acres within the modeled Alternative 2, Scenario 2, noise contours (excluding airfield property and including land area only). Existing noise contours encompass approximately 599.8 acres, not including WFF Main Base property or water (see Section 3.5.3), while the projected noise contours for Alternative 2, Scenario 2, on Runway 10/28 encompass approximately 754.9 acres, an increase of 155.1 acres.

Table 3-21 Land Area, Housing Units, and Estimated Number of People within Projected Noise Zones under Alternative 2, Scenario 1, at Wallops Flight Facility Main Base

Noise Zone (dB DNL)	Existing Conditions			Projected Conditions		
	Land Area (Acres)	Housing Units	Estimated Population ¹	Land Area (Acres) ²	Housing Units ²	Estimated Population ²
Runway 04/22						
65 to 70	536.2	352	834	729.8 (+193.6)	430 (+78)	1,019 (+185)
70 to 75	63.6	78	185	78.7 (+15.1)	113 (+35)	268 (+83)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Total	599.8	430	1,019	808.5 (+208.7)	543 (+113)	1,287 (+268)

Note:

¹ During land surveys conducted in February 2012, the Navy, with the aid of GIS features, recorded the locations of housing unit (residential or campground) properties within the vicinity of Wallops Flight Facility Main Base. Housing units within the Chincoteague Bay Trails End Association, Inc., which is a private, waterfront campground resort, were identified using Accomack County GIS data depicting parcels with taxable structures. Population for all housing units was estimated based on an average of 2.37 people per household, which is the average number of people per household for Accomack County, based on the 2010 U.S. Census.

² The changes in acres, housing units, and estimated population between the existing and projected conditions are noted in parentheses.

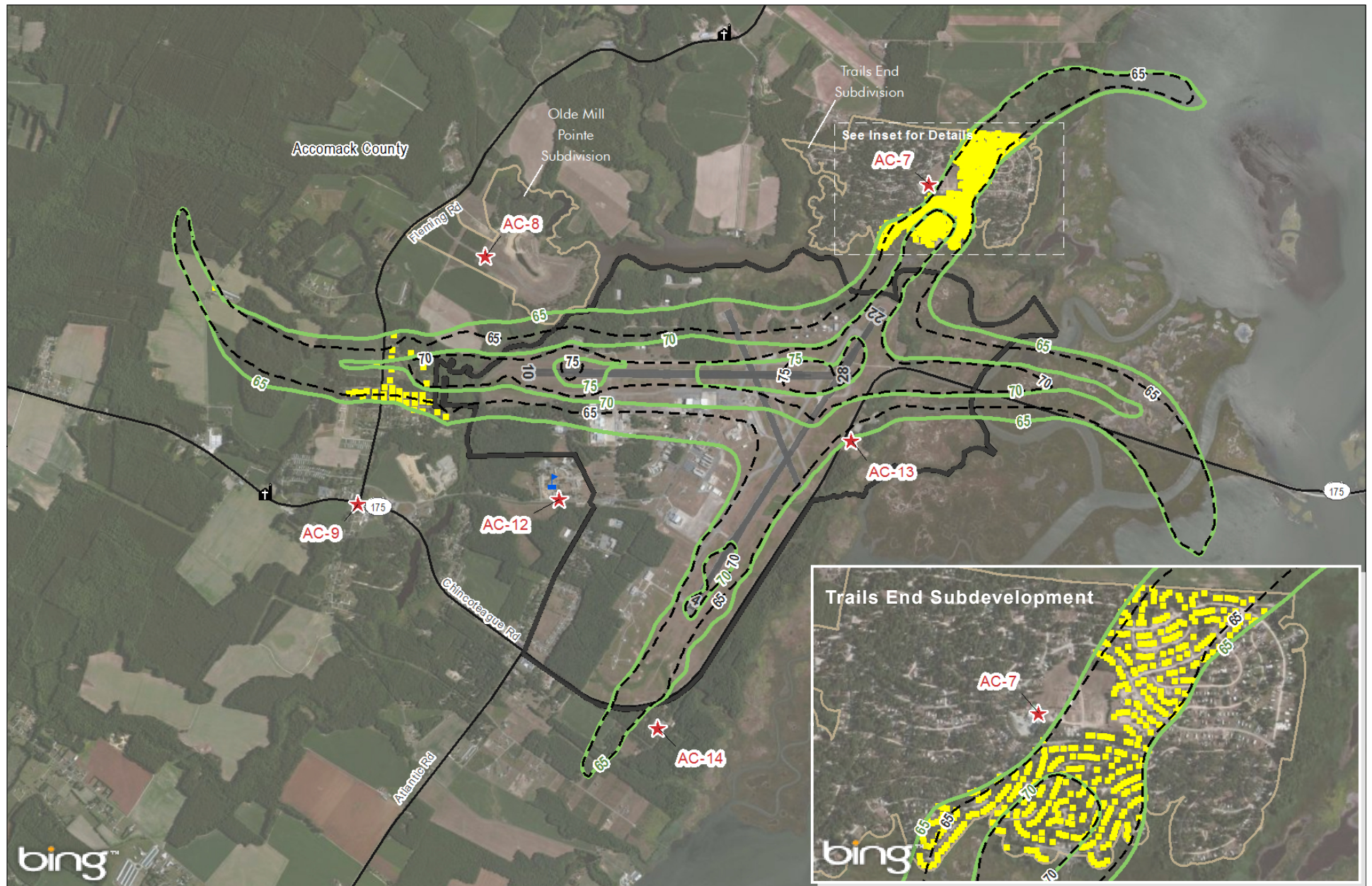
Table 3-22 Land Area, Housing Units, and Estimated Number of People within Projected Noise Zones under Alternative 2, Scenario 2, at Wallops Flight Facility Main Base

Noise Zone (dB DNL)	Existing Conditions			Projected Conditions		
	Land Area (Acres)	Housing Units	Estimated Population ¹	Land Area (Acres) ²	Housing Units ²	Estimated Population ²
Runway 10/28						
65 to 70	536.2	352	834	649.2 (+113.0)	419 (+67)	993 (+159)
70 to 75	63.6	78	185	105.7 (+42.1)	84 (+6)	199 (+14)
Greater than 75	0	0	0	0 (0)	0 (0)	0 (0)
Total	599.8	430	1,019	754.9 (+155.1)	503 (+73)	1,192 (+173)

Note:

¹ During land surveys conducted in February 2012, the Navy, with the aid of GIS features, recorded the locations of housing unit (residential or campground) properties within the vicinity of Wallops Flight Facility Main Base. Residences within the Chincoteague Bay Trails End Association, Inc., which is a private, waterfront campground resort, were identified using Accomack County GIS data depicting parcels with taxable structures. Population for all housing units was estimated based on an average of 2.37 people per household, which is the average number of people per household for Accomack County, based on the 2010 U.S. Census.

² The changes in acres, housing units, and estimated population between the existing and projected conditions are noted in parentheses.



Source: ESRI 2010.

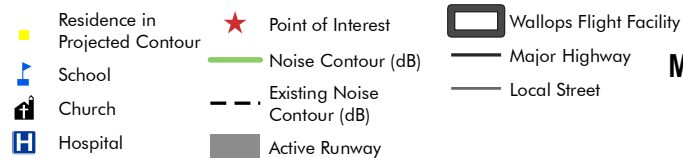


Figure 3-15
Modeled Projected Noise Contours with Residences
Alternative 2 Scenario 2
 Wallops Flight Facility

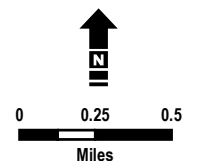


Table 3-22 also presents the estimated number of housing units (residential and seasonal campground) and estimated number of people within the modeled Alternative 2, Scenario 2, noise zones. The estimated population within the 65 to 70 dB DNL and 70 to 75 dB DNL noise zones was calculated using the average household size for Accomack County, recorded in the 2010 U.S. Census, of 2.37 people (and rounding up). Existing noise contours extend off WFF Main Base property (as discussed in Section 3.2.3) and are presented in Table 3-22 for comparison. As noted in Section 1.4.1.2, during the incorporation of noise contour changes related to the revised holding pattern location and altitude conducted between the Draft EA and the Final EA, additional Trails End Campground properties within the greater than 65 dB DNL noise zone for Alternative 2 were identified. Table 3-22 presents the revised estimate for the number of properties and residences and estimated population within the Alternative 2, Scenario 2, noise zone. Under implementation of Alternative 2, Scenario 2, there would be an estimated increase of 73 housing units and 173 individuals within the 65 dB DNL and above noise contour. The additional people within the noise zones in Accomack County represent approximately 0.5 percent of the total population. Of this total, 14 of the individuals, which represents 0.04 percent of the total county population, would be in the 70 to 75 dB DNL noise zone.

The majority of individuals who would be impacted by the increase in noise under Alternative 2, Scenario 2, would be in the Trails End community. Trails End is a private waterfront campground resort, zoned for agricultural use, that was built near the end of the WFF Main Base pre-existing active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. The increase in noise would also be temporary and intermittent, and the aircraft operations generating the noise would be consistent with the existing operations at WFF.

Trails End owners are primarily “weekenders” who visit the community on weekends year-round and during vacations. The Trails End community association considers 300 of the 2,500 lots to be occupied full time. Accomack County has zoned Trails End as agricultural, not residential (Accomack County 2012).

No religious facilities, schools, day care centers, or hospitals are within the noise contours for the proposed operations.

3.5.4.3 Sound Exposure Level and Points of Interest

The points of interest identified by and with concurrence from Accomack County and the USFWS are shown on Figure 3-13. The SEL values would differ slightly between Alternative 2, Scenario 1, and Alternative 2, Scenario 2, due to the difference in the E-2/C-2 aircraft operating on Runway 04/22 and Runway 10/28. Therefore, the SEL values are presented separately within this section.

3.5.4.3.1 Alternative 2, Scenarios 1 and 2

Points of interest that fall within or near the Alternative 2, Scenarios 1 or 2, noise contours are also depicted on Figure 3-14 (see Section 3.5.3 for a description and

figure showing all points of interest). Table 3-23 presents the maximum modeled SEL value for projected Navy E-2/C-2 operations at WFF Main Base under Alternative 2, Scenarios 1 and 2. The maximum modeled SEL values for the existing environment are also repeated in Table 3-23 for comparison to the projected environment.

The E-2/C-2 operation type and the distance of the point of interest from the aircraft, along with the modeled SEL value for that point of interest for Alternative 2, Scenarios 1 and 2, are provided. Each Location ID presented in the table corresponds to a point of interest depicted on Figures 3-12 (and Figure 3-14, if applicable).

For the projected environment, the E-2/C-2 operations that generated the maximum modeled SEL values were primarily crew swap operations but also included FCLP. SEL values for Alternative 2, Scenarios 1 and 2, ranged from a low of 61.1 dB SEL to a high of 95.1 dB SEL.

Examining the data provided in Table 3-23 shows that E-2/C-2 aircraft operating at WFF Main Base have a lower modeled SEL value for all points of interest than the jet fighters (FA-18) that currently operate at the installation.

3.5.4.4 Noise Impact Conclusion

Noise is subjective because individuals perceive noise impacts differently. To explain the impacts of noise on the environment and resources analyzed, the subjectivity of noise must be removed. To remove the subjectivity, we apply a scientifically based, and DOD approved, modeling analysis to quantify noise impacts. The two metrics presented in this noise analysis section (DNL and SEL) provide two different approaches to quantifying noise impacts—based on average noise exposure and single-event noise exposures. DNL is the accepted metric for measuring community reaction to noise; however, SEL provides a supplemental metric for describing noise from a single event.

For the DNL analysis, the proposed Navy E-2/C-2 operations would increase the land size in the greater than 65 dB DNL noise zone by approximately 208.7 and 155.1 acres for Scenarios 1 and 2, respectively.

For Alternative 2, Scenario 1, this would impact approximately 268 individuals who were previously not within the greater than 65 dB DNL noise zone. Based upon the number of people in Accomack County in 2010 (33,164), this is approximately 0.8 percent of the total county population. However, there would be more individuals (an increase of 83 people, or approximately 0.3 percent of the total county population) within the 70 dB DNL and greater noise zone than under existing conditions.

Table 3-23 Modeled Sound Exposure Level for Points of Interest under Alternative 2, Scenario 1 and Scenario 2, at Wallops Flight Facility Main Base

Location ID	Description	Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a				Alternative 2, Scenario 1 Runway 04/22 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 2, Scenario 2 Runway 10/28 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
		Aircraft	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)
AC-1	Intersection of US 13 and SR 709	Jet Fighter	Arrival	1.76	88.9	Crew Swap	1.08	79.6	Crew Swap	1.06	80.4
AC-2	T's Corner (east of intersection of US 13 and Chincoteague Road)	Jet Fighter	Departure	0.60	105.6	Crew Swap	1.34	78.6	Crew Swap	0.45	89.2
AC-3	Arcadia High School	Jet Fighter	Departure	1.40	95.3	Crew Swap	0.56	84.1	Crew Swap	0.60	82.8
AC-4	Temperanceville at Intersection of US 13 and SR 695	Jet Fighter	Departure	1.59	92.8	Crew Swap	1.80	75.4	Crew Swap	1.93	71.8
AC-5	Captain's Cove Community Pool	Jet Fighter	Departure	0.77	101.8	Crew Swap	1.71	76.7	Crew Swap	0.61	83.5
AC-6	Horntown at Intersection of SR 679 and SR 709	Jet Fighter	Touch and Go	0.40	106.2	FCLP	0.12	92.8	Crew Swap	0.57	83.0
AC-7	Trails End Campground Community Pool	Jet Fighter	Arrival	0.13	116.0	Crew Swap	0.23	93.8	FCLP	0.28	87.3
AC-8	Olde Mill Pointe Traffic Circle	Jet Fighter	Touch and Go	0.27	110.4	Crew Swap	0.55	82.0	Crew Swap	0.55	87.7

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^c The Operation Type includes the following; Arrival = an aircraft flight track arriving at the airfield, Departure = an aircraft flight track departing from the airfield, and Touch and Go = a pattern flown by an aircraft where it approaches the airfield and touches down on the runway and then accelerates, performing a takeoff without coming to a full stop.

^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-23 Modeled Sound Exposure Level for Points of Interest under Alternative 2, Scenario 1 and Scenario 2, at Wallops Flight Facility Main Base

Location ID	Description	Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a				Alternative 2, Scenario 1 Runway 04/22 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 2, Scenario 2 Runway 10/28 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
		Aircraft	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)
AC-9	Wattsville at Intersection of SR 679 and Chincoteague Road	Jet Fighter	Arrival	0.20	112.7	Crew Swap	0.43	80.5	Crew Swap	0.63	86.7
AC-10	Atlantic at Intersection of SR 679 and Nocks Landing Road	Jet Fighter	Departure	0.68	104.2	Crew Swap	0.42	88.7	Crew Swap	0.94	77.5
AC-11	Assawoman at Intersection of SR 670 and Wallops Island Road	Jet Fighter	Departure	1.87	89.4	Crew Swap	0.46	73.0	Crew Swap	2.77	67.2
AC-12	Marine Science Consortium	Jet Fighter	Departure	0.59	105.8	Crew Swap	0.37	85.4	Crew Swap	0.34	89.1
AC-13	NASA Visitor Center	Jet Fighter	Departure	0.24	117.2	Crew Swap	0.21	95.1	Crew Swap	0.32	93.0
AC-14	USFWS Maintenance Yard at Wallops Island National Wildlife Refuge	Jet Fighter	Arrival	0.17	113.7	Crew Swap	0.22	94.3	Crew Swap	0.51	83.6
AC-15	Wallops Island	Jet Fighter	Departure	2.04	89.4	FCLP	0.85	79.2	Crew Swap	2.62	71.0
AC-16	Chincoteague High School	Jet Fighter	Arrival	0.27	91.2	Crew Swap	4.61	67.1	Crew Swap	2.87	70.9

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^c The Operation Type includes the following; Arrival = an aircraft flight track arriving at the airfield, Departure = an aircraft flight track departing from the airfield, and Touch and Go = a pattern flown by an aircraft where it approaches the airfield and touches down on the runway and then accelerates, performing a takeoff without coming to a full stop.

^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

Table 3-23 Modeled Sound Exposure Level for Points of Interest under Alternative 2, Scenario 1 and Scenario 2, at Wallops Flight Facility Main Base

Location ID	Description	Existing Conditions Aircraft Type and Operation with the Maximum Modeled Sound Exposure Level ^a				Alternative 2, Scenario 1 Runway 04/22 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b			Alternative 2, Scenario 2 Runway 10/28 E-2/C-2 Operation with Maximum Modeled Sound Exposure Level ^b		
		Aircraft	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)	Operation Type ^c	Distance from Aircraft ^d	SEL (dB)
AC-17	Chincoteague Waterfront Park	Jet Fighter	Departure	1.97	89.9	Crew Swap	4.16	68.5	Crew Swap	2.52	72.6
AC-18	Chincoteague Chamber of Commerce on Piney Island	Jet Fighter	Departure	3.25	82.6	Crew Swap	5.50	63.4	Crew Swap	3.84	67.1
AC-19	Curtis Merritt Harbor, Chincoteague Island	Jet Fighter	Arrival	2.14	87.5	Crew Swap	2.74	71.6	Crew Swap	3.18	70.4
AC-20	Tom's Cove Visitor Center	Jet Fighter	Arrival	3.63	75.0	Crew Swap	6.04	61.1	Crew Swap	5.82	62.9
AC-21	Mid-Atlantic Regional Spaceport	Jet Fighter	Departure	3.67	83.1	Crew Swap	4.06	69.0	Crew Swap	4.70	63.6
AC-22	Withams at Intersection of SR 693 and SR 703	Jet Fighter	Departure	1.04	98.6	Crew Swap	0.69	80.8	Crew Swap	0.93	81.5

Source: BRRC 2012

Notes:

^a For the existing environment, the aircraft type and operation that had the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^b For the projected environment, the E-2/C-2 operation with the highest modeled SEL for the specific point of interest was chosen for presentation in this table.

^c The Operation Type includes the following; Arrival = an aircraft flight track arriving at the airfield, Departure = an aircraft flight track departing from the airfield, and Touch and Go = a pattern flown by an aircraft where it approaches the airfield and touches down on the runway and then accelerates, performing a takeoff without coming to a full stop.

^d The Distance to Aircraft is the diagonal distance from the point of interest to the aircraft (accounting for both altitude and distance along the ground) at the closest point along the given flight track for that operation.

For Alternative 2, Scenario 2, the increase in noise would impact approximately 173 individuals who were previously not within the greater than 65 dB DNL noise zone, which would equate to 0.5 percent of the total county population. There would also be more individuals (an increase of 14 people, or 0.04 percent of the total county population) within the 70 dB DNL and greater noise zone than under existing conditions.

Aviation and typical community noise levels near airports are not comparable to the occupational or recreational noise exposures associated with hearing loss (Wyle 2012). Studies of aircraft noise levels associated with civilian airport activity have not definitively correlated permanent hearing impairment with aircraft activity (Newman and Beattie 1985, Eldred and von Gierke 1993). A 2009 DOD policy directive requires that hearing loss risk be estimated for military installations for the at-risk population, defined as the population exposed to DNL greater than or equal to 80 dB and higher (DOD 2009). The noise generated by Scenario 1 or 2 does not reach 80 dB DNL, even on-base. There would not be a significant risk for potential loss of hearing associated with the Navy's proposed action at WFF Main Base. For calculation purposes, the proposed action does generate SEL values higher than 80 dB; however, the criterion for hearing loss is analyzed in DNL, the accepted metric for assessing potential long-term hearing loss, and the DNL analysis for the proposed action indicates there would not be a significant risk for hearing loss.

As noted in the existing environment discussion, several activities conducted at WFF's three properties result in noise, including aircraft operations at WFF Main Base and rocket launches at the Wallops Island property (located approximately 6 miles from the southern boundary of WFF Main Base). These noise sources all combine to create the noise environment experienced by the local community. As a result of the Navy's proposed action, there would be a slight increase in average noise (DNL noise contours) expected at WFF Main Base for both Scenarios 1 and 2 under Alternative 2. The majority of individuals who would be impacted by the increase in noise under Alternative 2, Scenario 1, would be in the Trails End community. Trails End is a private waterfront campground resort, zoned for agricultural use, that was built near the end of the WFF Main Base pre-existing active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. The increase in noise would also be temporary and intermittent, and the aircraft operations generating the noise would be consistent with the existing operations at WFF.

Given the limited change in noise from the existing to the projected environment and given the fact that most of the individuals potentially impacted by additional noise would be in the Trails End community, a temporary lodging/seasonal camping resort that is not fully occupied year-round, there would be no significant impact from noise as a result of the Navy's implementation of Alternative 2 for either Scenario 1 or 2 at WFF Main Base. The proposed Navy E-2/C-2 FCLP operations would also not result in a higher maximum modeled SEL value at any of the points of interest when compared to the existing conditions at and around WFF Main Base. Furthermore, there would be no significant impact from noise if

the option of conducting daytime operations on both Runways 04/22 and 10/28 were chosen, as the noise zones for this option would fall within the modeled noise zones for Scenarios 1 and 2.

3.6 Land Use

This section examines land use and land use controls on and around each of the airports under analysis.

3.6.1 Existing Land Use at Emporia-Greenville Regional Airport

The study area for this analysis at Emporia-Greenville includes the area within the modeled 65 dB DNL and greater noise zone. Greenville County, Southampton County, and the City of Emporia are described in this section.

For Emporia-Greenville, the FAR Part 150 Noise Compatibility Program was used as a framework for discussion and evaluation of land use compatibility. The FAR Part 150 Noise Compatibility Program was established under the Aviation Safety and Noise Abatement Act of 1979. It is the primary federal regulation guiding planning for aviation noise compatibility on and around public-use airports. This program allows airport operators to voluntarily submit noise exposure maps and noise compatibility programs to the FAA for review and approval. A noise exposure map includes the depiction of an airport, its noise contours (65, 70, and 75 dB), and its surrounding area. A noise compatibility program details measures both taken and proposed to reduce existing incompatible land uses and prevent additional incompatible land uses in the area within the noise contours (FAA n.d.[b]). Note that the recommendations outlined in FAR Part 150 are advisory and are not binding for the Navy's proposed action, but they are used in this analysis to provide a frame of reference for discussion of compatible land uses in the Navy's projected noise zones for Emporia-Greenville.

The FAR Part 150 Program provides compatibility recommendations for Standard Land Use Coding Manual-classified land uses. Table 3-24 provides a summary of these recommendations, which are applied to the noise zones (i.e., the area between two noise contours) modeled for the projected environment under Alternative 1.

The City of Emporia, Greenville County, and Southampton County are not located within the Commonwealth of Virginia's coastal zone, as defined by the Virginia Coastal Zone Management Program, and are therefore not subject to the programs and policies defined by the program (VDEQ 2012). Therefore, coastal zone management is not analyzed for the Navy's proposed action at Emporia-Greenville.

3.6.1.1 Land Use and Plans

Emporia-Greenville Regional Airport is located within Greenville and Southampton counties in the southeast region of the Commonwealth of Virginia. The airport is approximately 10 miles north of the Virginia-North Carolina state line and 1 mile east of the City of Emporia.

Table 3-24 Land Use Compatibility with Day-Night Average Sound Levels

Land Use	Day-Night Average Sound Level in Decibels					
	Below 65	65 to 70	70 to 75	75 to 80	80 to 85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y

Notes:

Y (Yes) = Land Use and related structure compatible without restrictions.

N (No) = Land Use and related structures are not compatible and should be prohibited.

NLR=Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (5) Land use compatible, provided special sound reinforcement systems are installed.
- (6) Residential buildings require an NLR of 25.
- (7) Residential buildings require an NLR of 30.
- (8) Residential buildings not permitted.

Table 3-24 Land Use Compatibility with Day-Night Average Sound Levels

Land Use	Day-Night Average Sound Level in Decibels					
	Below 65	65 to 70	70 to 75	75 to 80	80 to 85	Over 85
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Source: 14 CFR Part 150, 2007

Notes:

Y (Yes) = Land Use and related structure compatible without restrictions.

N (No) = Land Use and related structures are not compatible and should be prohibited.

NLR=Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or areas where the normal noise level is low.
- (5) Land use compatible, provided special sound reinforcement systems are installed.
- (6) Residential buildings require an NLR of 25.
- (7) Residential buildings require an NLR of 30.
- (8) Residential buildings not permitted.

Regional development is concentrated in the City of Emporia, a small urban municipality. Residential development is the city's dominant land use and is predominantly single-family and clustered in older, denser neighborhoods near the downtown core. Three major highways cross the City of Emporia: Interstate 95, Route 301, and Route 58. There are many commercial establishments in the city, particularly adjacent to the Interstate 95 interchange. These are businesses that primarily cater to motorists, including fast food restaurants, hotels/motels, service stations, and convenience stores.

Greensville County is rural, sustained by undisturbed natural areas as well as agricultural land uses. Most of the agricultural uses are located in the southern portion of the county; major crops include peanuts, tobacco, wheat, hay, corn, cotton, and soybeans (County of Greensville, Virginia, and K. W. Poore & Associates, Inc. 2008). Residential uses in Greensville County are predominantly low density, with some higher densities located near the population centers of the City of Emporia and the Town of Jarratt.

Southampton County also exhibits a rural character; the majority of the county is either undeveloped or devoted to agricultural use. Residential uses are predominantly low density and located near the City of Franklin and within smaller population centers such as the towns of Courtland and Ivor. Recent residential developments have been constructed along secondary roads in traditionally agricultural areas.

The City of Emporia and Greensville County are part of the Crater Planning District Commission's jurisdiction. The Crater Planning District Commission represents 11 local governments in south central Virginia (Crater PDC 2012). Southampton County is within the Hampton Roads Planning District Commission's jurisdiction. The Hampton Roads Planning District Commission represents 16 local governments in southeastern Virginia (HRPDC 2012). Both planning district commissions publish or disseminate data on the demographic and economic characteristics of their member municipalities and regions as a whole.

The Crater PDC represents the local governments of the cities of Colonial Heights, Emporia, Hopewell, and Petersburg and the counties of Charles City, Chesterfield, Dinwiddie, Greensville, Prince George, Surry, and Sussex (Crater PDC 2012).

The HRPDC represents the local governments of the cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the counties of Gloucester, Isle of Wight, James City, Southampton, Surry, and York (HRPDC 2012).

Emporia-Greensville Regional Airport

Emporia-Greensville Regional Airport is owned and operated by the Emporia Greensville Airport Commission. The airport occupies approximately 355 acres, including 325 acres in Greensville County and 30 acres in Southampton County. It is bordered by Route 58 to the south, James River Junction (Route 623) to the northwest, and privately owned parcels to the northeast. The airfield is currently zoned M-1, Industrial District, and B-2, General Commercial Business (County of Greensville, Virginia, and K. W. Poore & Associates, Inc., 2008). The predominant land uses at the airport support air operations, including runways, taxiways, and parking aprons. Buildings include terminal buildings and hangars. No maintenance shops or flight schools currently operate out of the airfield. Land uses on airport property but not associated with air operations include a truck school and the Army National Guard. The truck school, associated with Southside Virginia Community College, is located in a single building at the southwestern portion of the airfield; however, there has been a reduction in the number of classes being held due to the downturn in the economy.

The Army National Guard Armory in Emporia, VA, which is a recruiting center, is located along Route 58 to the southwest of the airfield on property owned by the Emporia-Greensville Airport Commission. A fire training facility, which is utilized by several municipalities for emergency response training, is located northeast of the airfield. Although this facility is not located on airport property, it is accessed by a road that runs through airport property.

Development immediately surrounding the airport includes residential, community services, commercial, and industrial uses. Single-family residential developments are located directly west of the airport boundary. Oak Grove

Baptist Church is located north of the airfield along James River Junction; however, the building is being reconstructed, so services are not currently being held at the facility. It is not known whether the congregation will resume worship at this location. A commercial establishment, Fred's Auto Parts, is located south of the airport along Route 58. The Mid-Atlantic Cotton Gin, an industrial operation, is also located south of the airport along Route 58. Remaining lands surrounding the airfield are forested or used for agriculture.

The existing noise contours at Emporia-Greenville Regional Airport do not extend beyond the airport property; thus, there are no incompatible land uses currently surrounding the airfield (Note: For this reason, a land use-specific figure and table of acreages within the noise contours at Emporia-Greenville has not been included within this section, but a figure and table of acres is present in Section 3.5.2).

Comprehensive Plans

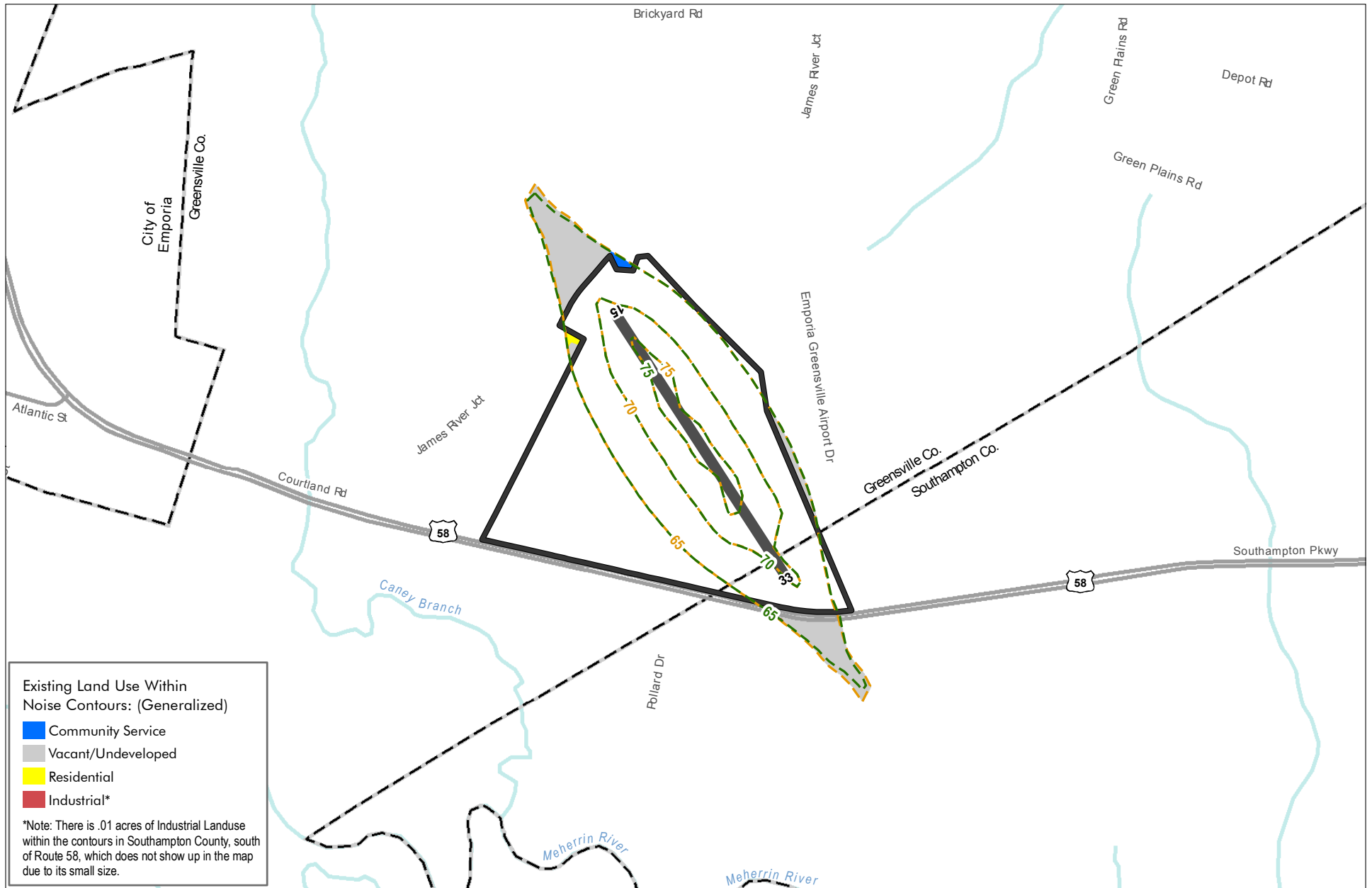
The Commonwealth of Virginia requires that every municipality adopt a comprehensive plan for “guiding and accomplishing a coordinated, adjusted, and harmonious development of the territory” (Commonwealth of Virginia 2007). The comprehensive plans for the municipalities surrounding Emporia-Greenville Regional Airport include the City of Emporia Comprehensive Plan (*Comprehensive Plan 2008-2028: City of Emporia, Virginia*) was last amended in 2008; it is a long-range plan that identifies issues and opportunities through 2028, Greenville County updated its comprehensive plan in May 2008 (*Comprehensive Plan 2008-2028: Greenville County, Virginia*), and Southampton County last updated its comprehensive plan in March 2007 (Southampton County 2007).

3.6.2 Impacts on Land Use at Emporia-Greenville Regional Airport

3.6.2.1 Impacts on Land Use and Plans

Land use impacts would be related to the noise effects of the Navy's FCLP operations at Emporia-Greenville on surrounding land uses. The FAR Part 150 Program provides guidance on land use compatibility around public-use airports. For land use planning purposes, the contours are divided into noise zones. Less than 65 dB DNL is generally considered an area of low or no noise impact, where most or all land uses are considered to be compatible. From 65 to 75 dB DNL is an area of increased noise impact in which some land use controls are required per FAA policy outlined in FAR Part 150. Finally, the 75 dB DNL and greater noise zone is the area most affected by noise and requires the greatest degree of land use control.

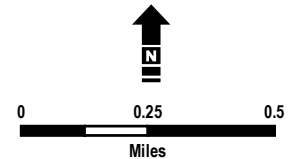
As noted previously, the existing noise contours at Emporia-Greenville do not extend beyond the airport boundary. The modeled 65 dB DNL and greater noise zone under Alternative 1, not including airport property, covers approximately 40.5 acres under Scenario 1 and 44.0 acres under Scenario 2 (see Figure 3-16). Approximately 39.7 acres (98.0 percent) of the land uses under Scenario 1 and 43.2 acres (98.2 percent) under Scenario 2 would be considered compatible with FAR Part 150 Program land use recommendations. These include large tracts of



Source: ESRI 2010; Southampton County, 2012; Greenville County, 2008.

Figure 3-16
Modeled Noise Exposure Contours with Existing Land Uses
Alternative 1 Scenarios 1 and 2
 Emporia-Greenville Regional Airport

- Noise Contour (dB) Alternative 1 Scenario 1 (3 Plane Pattern Only)
- Noise Contour (dB) Alternative 1 Scenario 2 (3- and 5 Plane Patterns)
- Active Runway
- Emporia-Greenville Regional Airport
- County Boundary
- Major Highway
- Local Street



vacant or undeveloped lands, including agriculture and forestland/open space, a small tract of industrial land use, and a community church. The community church would be considered compatible with FAR Part 150 Program land use recommendations if sound attenuation were to be implemented to reduce the noise level by 25 dB.

If Alternative 1, Scenarios 1 or 2, are chosen, approximately 0.8 acre of land (designated as residential land use) within the modeled noise zones would not be considered compatible under FAR Part 150 Program land use recommendations. This represents 2 percent and 1.8 percent of the total land within the modeled noise zones under Scenario 1 and 2, respectively. Incompatible areas would be composed of residential properties located north-northwest of Runway 15 in Greenville County (see Table 3-25).

Table 3-25 Land Uses within Noise Zones under Alternative 1 at Emporia-Greenville Regional Airport (in Acres)

Generalized Land Use ¹	65 to 70 dB DNL	70 to 75 dB DNL	Greater than 75 dB DNL	Total
Scenario 1: Three-Plane Scheme				
Residential ²	0.8	0.0	0.0	0.8
Public Assembly	1.1	0.0	0.0	1.1
Schools and Hospitals	0.0	0.0	0.0	0.0
Manufacturing	< 0.1	0.0	0.0	< 0.1
Parks	0.0	0.0	0.0	0.0
Business Services	0.0	0.0	0.0	0.0
Vacant/Undeveloped	38.6	0.0	0.0	38.6
Total	40.5	0.0	0.0	40.5
Scenario 2: Three- and Five-Plane Scheme				
Residential ²	0.8	0.0	0.0	0.8
Public Assembly	1.1	0.0	0.0	1.1
Schools and Hospitals	0.0	0.0	0.0	0.0
Manufacturing	0.1	0.0	0.0	0.1
Parks	0.0	0.0	0.0	0.0
Business Services	0.0	0.0	0.0	0.0
Vacant/Undeveloped	42.0	0.0	0.0	42.0
Total	44.0	0.0	0.0	44.0

Source: City of Emporia 2008, County of Greenville, Virginia, and K. W. Poore & Associates, Inc., 2008, Southampton County 2012

Note:

- 1 Generalized land use classifications represent broad land use patterns and relationships between uses. As applied in this EA, generalized land use classifications concentrate land use subclasses or similar land use classifications. For example, 'Residential' includes land use subclasses such as single family, multi-family, and manufactured housing. Additionally, 'Vacant/Undeveloped' includes similar land use classifications of agricultural, vacant land, and forested and conservation lands.
- 2 Residential land uses are not considered compatible with FAR Part 150 Program land use recommendations in greater than 65 dB DNL noise zone.

3.6.2.2 Land Use Compatibility Impact Conclusion

Based upon the land use compatibility analysis and the compatibility with local land use controls, there would be no significant direct or indirect impact to land use as a result of implementation of Alternative 1, Scenario 1 or 2. For Scenarios 1 and 2, an increase of 0.8 acre of land designated as residential land use within the modeled 65 dB DNL or greater noise zones would be indirectly impacted by the Navy's proposed action. FAR Part 150 designates the DNL 65 dB contour as the cumulative noise exposure level above which residential land uses would not be considered compatible. The Navy would not consider this impact to be significant, and it would not require mitigation by the Navy, given the small size of the area, the current aircraft activity, the general noise environment already present at Emporia-Greenville, and because the noise generated from the Navy's proposed action would be temporary and intermittent. To meet FAA-specific NEPA requirements, the land use designation for this property must be changed to reflect a non-residential status, and the Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use.

3.6.3 Existing Land Use at Wallops Flight Facility

The study area for this analysis at WFF Main Base includes the area inside of the modeled 65 dB DNL and greater noise zone. To provide context, Accomack County is described in this section. The FAR Part 150 Program provides guidance on land use compatibility around public-use airports. Therefore, it was not used as the framework for discussion and evaluation of land use compatibility for WFF, a federally owned airport that does not allow public access.

3.6.3.1 Land Use and Plans

WFF Main Base is located in the northeastern portion of Accomack County, which is on the Delmarva Peninsula and part of the Eastern Shore of Virginia. WFF Main Base lies less than 4 miles south of the Virginia-Maryland state line and approximately 5 miles west of the Town of Chincoteague, Virginia. The Mainland and the Wallops Island Launch Site are located approximately 7 miles south of WFF Main Base.

Accomack County and the Town of Chincoteague are part of the Accomack-Northampton Planning District Commission's jurisdiction, which represents the local governments of Accomack and Northampton counties and the Town of Chincoteague, the largest town in the planning district (A-NPDC n.d.[b]). The commission is a regional entity that supports local planning and development efforts and provides technical assistance on behalf of Virginia (A-NPDC n.d.[a]).

Accomack County is composed of small towns and villages interspersed throughout a rural landscape. The county is predominantly undeveloped, with large concentrations of farms, forests, and wetlands. Agriculture is a dominant land use in the county and a major element of its economy.

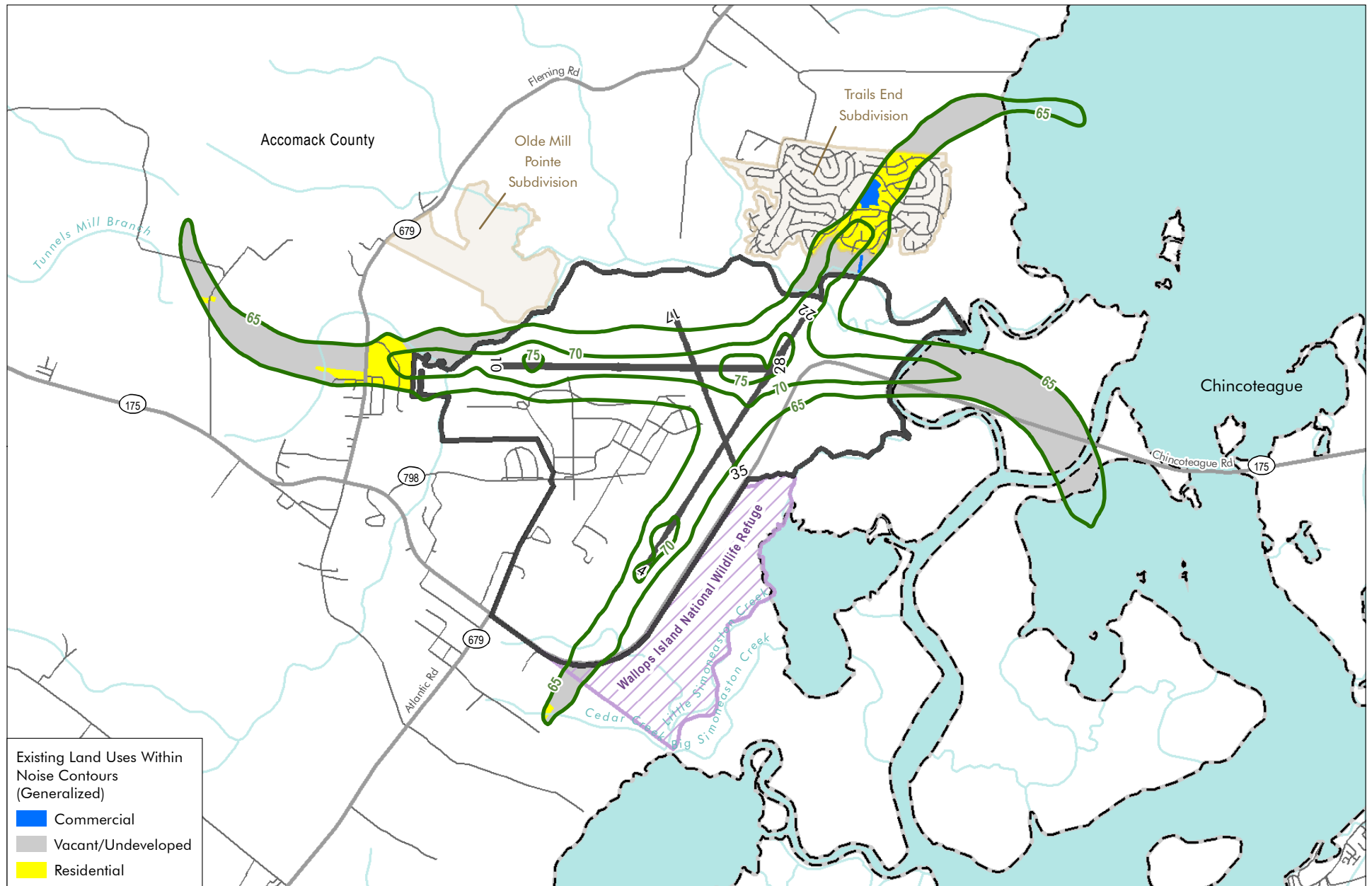
Residential land uses in Accomack County are predominantly concentrated in and around population centers where public facilities and services are provided. In a recent trend, however, residential land uses have become more dispersed; the

population has been settling on isolated lots rather than in compact villages and hamlets (Accomack County 2008). The largest population center in Accomack County is the Town of Chincoteague, located on Chincoteague Island. The Town of Chincoteague has a population of 2,941 people (U.S. Census Bureau, 2010 Census). Commercial and industrial land uses in Accomack County are primarily sited adjacent to Route 13, the Eastern Shore's primary route for local and through traffic.

Public park facilities and recreation centers are limited in Accomack County. Most of these sites are associated with educational institutions, and public use of them is limited. Accomack County has only two county-owned parks: Wayside Park, along Route 13 near the Town of Parksley, and Wallops Park, within the Wallops Research Park. In addition, the county has an agreement with the Town of Wachapreague for use of Town Park (Accomack County 2008). Other types of public recreation available in the county include beach access at Assateague National Seashore and the barrier islands, and public wildlife areas at the Chincoteague National Wildlife Refuge, Parkers Marsh Natural Area, and Saxis Wildlife Management Area.

WFF Main Base consists of 1,946 acres. Land uses at the facility include offices, laboratories, maintenance and service facilities, a NASA-owned airport, air traffic control facilities, hangars, runways, and aircraft maintenance and ground support buildings. WFF Main Base is home to the NASA Visitor Center, located east of Runway 4/22 and southeast of Runway 10/28 along Virginia Route 175. The NASA Visitor Center is open to the public Thursday through Monday from 10:00 a.m. through 4:00 p.m. In addition, WFF Main Base contains water and sewage treatment plants, rocket motor storage magazines, Navy administration and housing as well as USCG housing, and other miscellaneous structures. WFF Main Base is zoned for industrial use by Accomack County. Figure 3-17 illustrates existing generalized land uses surrounding WFF Main Base, which primarily include residential, commercial/business services, and vacant/undeveloped uses (including agricultural land, forested land, and conservation land). The acreages of each land use area within the existing noise zones are shown in Table 3-26.

Chincoteague Bay Trails End is located to the northeast of WFF Main Base. This development is zoned agricultural by Accomack County; however, it is actually a private waterfront campground resort providing temporary lodging/seasonal camping and is considered residential for the purposes of this analysis. The property is approximately 750 acres that includes over 2,500 deeded lots (Chincoteague Trails End Association 2012). Individual lots are privately owned; owners are allowed to construct permanent camper additions, room enclosures, and cottages (Chincoteague Trails End Association 2012). Communal facilities at Chincoteague Bay Trails End include recreational amenities, such as a marina, boat ramps, and boat slips.



Source: ESRI 2010; USGS NLCD 2006.

Figure 3-17
Land Uses in the Vicinity of
Wallops Flight Facility

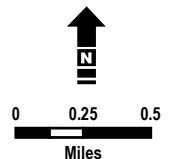


Table 3-26 Land Uses within the Existing Noise Zones, Wallops Flight Facility Main Base (in Acres)

Generalized Land Use ¹	Noise Zones			Total
	65 to 70 dB DNL	70 to 75 dB DNL	Greater than 75 dB DNL	
Residential	102.7	23.0	0.0	125.7
Public Assembly	0.0	0.0	0.0	0.0
Schools and Hospitals	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Parks	0.0	0.0	0.0	0.0
Business Services	7.4	0.0	0.0	7.4
Vacant/Undeveloped	426.1	40.6	0.0	466.7
Total	536.2	63.6	0.0	599.8

Note:

¹ Generalized land use classifications represent broad land use patterns and relationships between uses. As applied in this EA, generalized land use classifications concentrate land use subclasses or similar land use classifications. For example, 'Residential' includes land use subclasses such as single family, multi-family, and manufactured housing. Additionally, 'Vacant/Undeveloped' includes similar land use classifications of agricultural, vacant land, and forested and conservation lands.

Olde Mill Pointe is a residential development to the northwest of WFF Main Base consisting of 99 parcels. Thirteen of the 56 parcels currently available for development have been sold. Individual lots are privately owned and designed for single-family residences. These residences may be for year-round use or seasonal/occasional use (Olde Mill Pointe 2010).

The Wallops Research Park, a technology complex that is home to aerospace and aviation operations, is located southeast of WFF Main Base. Use of this industrial park is divided amongst NASA, Accomack County, and the Marine Science Consortium. The following land uses are present at this facility: research and development/industrial, aviation, gateway research and development/industrial, and an Accomack County recreational park. The Village of Wattsville is also located to the southwest of WFF Main Base. Associated with this village are rural residential and general commercial land uses. Businesses in this area include fuel stations, retail stores, markets, and restaurants.

Comprehensive Plans

The Commonwealth of Virginia requires that every municipality adopt a comprehensive plan for "guiding and accomplishing a coordinated, adjusted, and harmonious development of the territory" (Commonwealth of Virginia 2007).

The current version of the Accomack County Comprehensive Plan, *Respecting the Past, Creating the Future: Accomack County Comprehensive Plan*, was adopted in 2008. It is a long-range plan that looks approximately 20 to 30 years into the future. In general, it focuses on strategic growth in and around existing communities and away from the shoreline and preservation of farmland to conserve important agricultural and natural resources (Accomack County 2008). According to the comprehensive plan, future development around WFF Main Base is expected to remain predominantly agricultural and industrial. However,

the plan designates a “Village Development Area” on lands west of WFF Main Base, adjacent to the Wallops Research Park. This “Village Development Area” represents an expansion of existing residential and general commercial developments within the Village of Wattsville. Future development is expected to take the form of coordinated, mixed-use projects that fit with the existing, traditional character of the county’s historic settlements.

The comprehensive plan also lists a future residential area in New Church, Virginia, northwest of WFF Main Base (Accomack County 2008). In addition, Olde Mill Pointe is a residential development consisting of 99 parcels in the vicinity of WFF Main Base. Thirteen of the 56 parcels currently available for development have been sold. Individual lots are privately owned and designed for single-family residences. These residences may be for year-round use or seasonal/occasional use (Olde Mill Pointe 2010).

3.6.3.2 National Wildlife Refuges

Positioned east of WFF Main Base, the Wallops Island National Wildlife Refuge consists of approximately 373 acres and is composed mainly of salt marsh and woodlands. Under the jurisdiction of USFWS and administered by the staff at Chincoteague National Wildlife Refuge, activities at Wallops Island National Wildlife Refuge include preserving and enhancing habitat for upland and wetland-dependent migratory bird species (USFWS n.d. [a]). The Wallops Island National Wildlife Refuge is generally not open for use by the public.

The Simoneston Bay sea-level fen (USFWS n.d. [a]), a critically imperiled state (S1) and global (G1) habitat, is located on the refuge (Fleming and Patterson 2012). This sea-level fen is one of four located in Virginia (VDCR NHP 2012). Sea-level fens are rare, small patches of ecological communities that occur at the edge of salt marshes above normal high-tide level and at the edge of sandy or gravelly slopes with a freshwater seep (VDCR NHP 2012, NatureServe 2012). Sea-level fens are freshwater features, although they are infrequently influenced by brackish water and saltwater (NatureServe 2012). This habitat is dominated by herbaceous vegetation with scattered shrubs and short trees (NatureServe 2012). Typical herbaceous species include twig rush (*Cladium mariscoides*), beaked spikerush (*Eleocharis rostellata*), white beakrush (*Rhynchospora alba*), few-flowered beakrush (*Rhynchospora oligantha*), spoon-leaved sundew (*Drosera intermedia*), ten-angled pipewort (*Eriocaulon decangulare* var. *decangulare*), coinleaf (*Centella erecta*), brown-fruited rush (*Juncus pelocarpus*), and bladderworts (*Utricularia* spp.) (VDCR NHP 2012). Shrub and short tree species include red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), sweetbay (*Magnolia virginiana*), and southern bayberry (*Myrica cerifera* var. *cerifera*) (VDCR NHP 2012).

Chincoteague National Wildlife Refuge offers preplanned or arranged educational and recreational visitation opportunities for the general public. In addition, hunting of white-tailed deer is available to the public through a lottery system. The Chincoteague National Wildlife Refuge is located on the Virginia side of Assateague Island and east of Wallops Island National Wildlife Refuge, outside of the study area. This refuge consists of more than 14,000 acres of beaches, dunes,

marshes, and maritime forest that provide habitat for migratory birds, and it is open to the general public year round (USFWS n.d. [b]).

3.6.3.3 Virginia Coastal Zone Management

This section discusses coastal zone management at WFF Main Base. The study area for coastal zone management at WFF Main Base is Accomack County. Accomack County is included in the Commonwealth of Virginia's coastal zone, as defined by the Virginia Coastal Zone Management Program (VDEQ 2012). Although federal lands are excluded from Virginia's coastal management area, activities on federal lands with any reasonably foreseeable effects on Virginia's coastal resources must be consistent with the enforceable policies of the Virginia Coastal Zone Management Program.

The Navy submitted a Coastal Consistency Determination for this proposed project to the VDEQ for concurrence on July 6, 2012. A response from VDEQ was received on September 6, 2012, which concurred that the Navy's proposed action at WFF Main Base is consistent with the Virginia Coastal Zone Management Program, provided all applicable permits and approvals are obtained as described in their letter response (see Appendix A, Agency Consultation).

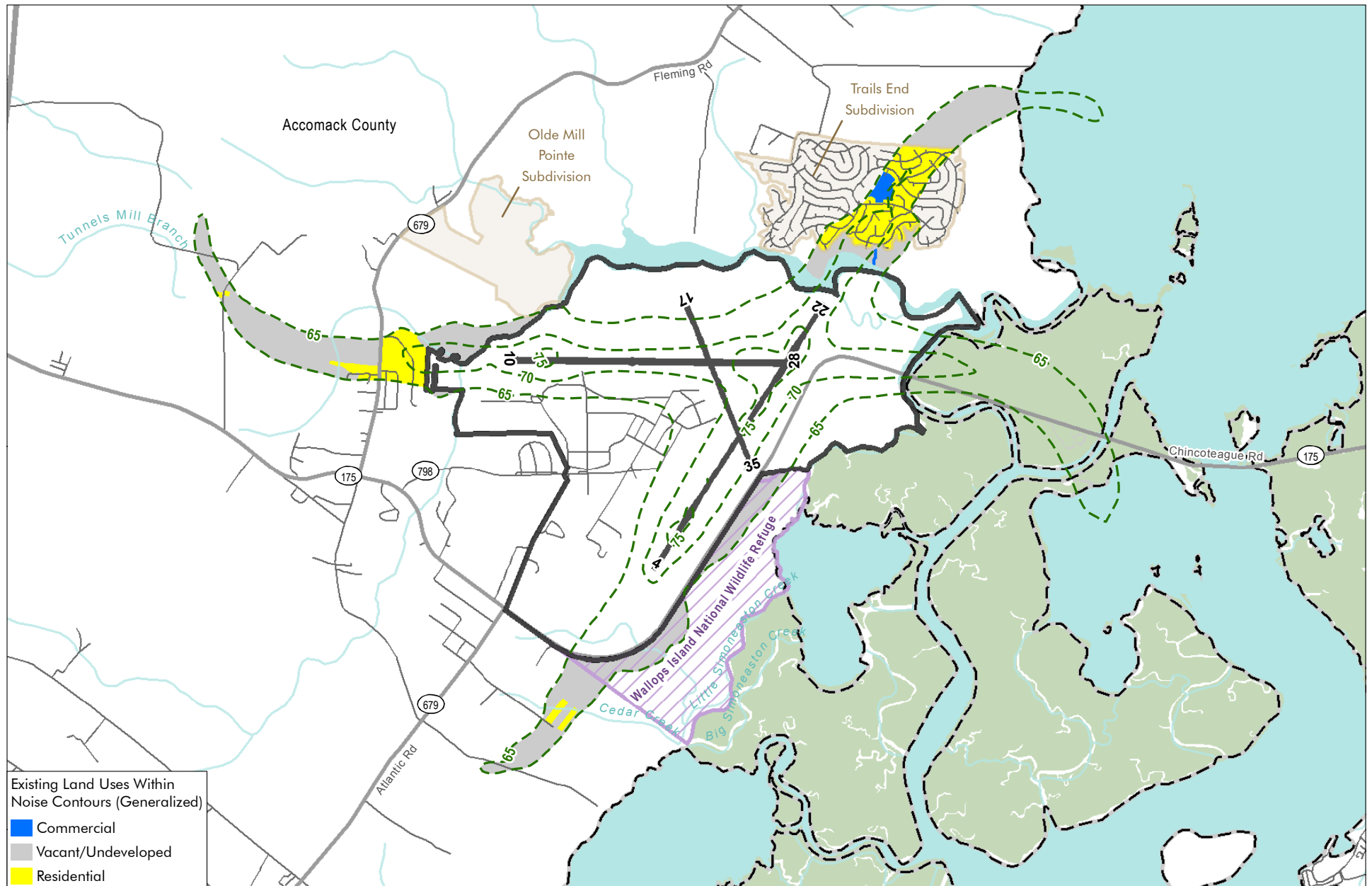
3.6.4 Impacts on Land Use at Wallops Flight Facility

3.6.4.1 Impacts on Land Use and Plans

Land use impacts would be related to the noise effects of the Navy's FCLP operations at WFF Main Base on surrounding land uses. For land use planning purposes, noise contours are generally divided into noise zones. Less than 65 dB DNL is generally considered an area of low or no noise impact. From 65 to 75 dB DNL is an area of increased noise impact. Finally, the 75 dB DNL and greater noise zone is the area most affected by noise.

The modeled 65 dB DNL and greater noise zone under existing conditions at WFF Main Base, not including WFF property, covers 599.8 acres. Under Alternative 2, the modeled 65 dB DNL and greater noise zone covers approximately 808.5 acres under Scenario 1 and 754.9 acres under Scenario 2 (see Figure 3-18 and Figure 3-19, respectively).

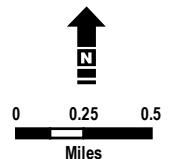
If Alternative 2, Scenario 1, is chosen, approximately 153.3 acres (19.0 percent) of the land within the modeled noise zones would be designated as residential land use. If Alternative 2, Scenario 2, is chosen, approximately 147.6 acres (19.6 percent) of the land within the modeled noise zones would be designated as residential land use (see Table 3-27). However, the majority of the acreage would already be above the 65 dB DNL noise zone under existing conditions. As noted in Table 3-26, the existing conditions at WFF Main Base include 125.7 acres of lands considered residential. Therefore, under Alternative 2 at WFF, there would be an additional 27.6 acres under Scenario 1 and 21.9 acres under Scenario 2 (see Table 3-27).











Source: ESRI 2010; MLG Companies website, 2012; USFWS 2012; The Nature Conservancy of Virginia, 2003.

Figure 3-18
Modeled Noise Exposure Contours with Existing Land Uses
Alternative 2 Scenario 1
 Wallops Flight Facility

- Noise Contour (dB)
- Active Runway
- Wallops Flight Facility
- Major Highway
- Local Street
- National Wildlife Refuge
- Virginia Marine Resources Commission Owned Lands



Commercial
Vacant/Undeveloped
Residential

 Noise Contour (dB)  Major Highway
 Active Runway  Local Street
 Wallops Flight Facility  National Wildlife Refuge
 Virginia Marine Resources
 Commission Owned Lands

Modeled Noise Exposure Contours with Existing Land Uses

Alternative 2 Scenario 2

Wallops Flight Facility

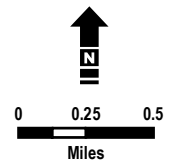


Table 3-27 Land Uses within Noise Zones under Alternative 2 at Wallops Flight Facility (in Acres)

Generalized Land Use ¹	Existing Environment				Projected Conditions			
	65 to 70 dB DNL	70 to 75 dB DNL	Greater than 75 dB DNL	Total	65 to 70 dB DNL	70 to 75 dB DNL	Greater than 75 dB DNL	Total
Scenario 1: Runway 04/22								
Residential	102.7	23.0	0.0	125.7	122.8 (+20.1)	30.5 (+7.5)	0.0 (0.0)	153.3 (+27.6)
Public Assembly	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Schools and Hospitals	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Manufacturing	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Parks	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Business Services	7.4	0.0	0.0	7.4	8.6 (+1.2)	0.8 (+0.8)	0.0 (0.0)	9.4 (+2.0)
Vacant/Undeveloped	426.1	40.6	0.0	466.7	598.4 (+172.3)	47.4 (+6.8)	0.0 (0.0)	645.8 (+179.1)
Total	536.2	63.6	0.0	599.8	729.8 (+193.6)	78.7 (+15.1)	0.0 (0.0)	808.5 (+208.7)
Scenario 2: Runway 10/28								
Residential	102.7	23.0	0.0	125.7	118.1 (+15.4)	29.5 (+6.5)	0.0 (0.0)	147.6 (+21.9)
Public Assembly	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Schools and Hospitals	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Manufacturing	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Parks	0.0	0.0	0.0	0.0	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Business Services	7.4	0.0	0.0	7.4	8.2 (+0.8)	0.0 (0.0)	0.0 (0.0)	8.2 (+0.8)
Vacant/Undeveloped	426.1	40.6	0.0	466.7	522.9 (+96.8)	76.2 (+35.6)	0.0 (0.0)	599.1 (+132.4)
Total	536.2	63.6	0.0	599.8	649.2 (+113.0)	105.7 (+42.1)	0.0 (0.0)	754.9 (+155.1)

Source: Accomack County 2012

Notes:

- Generalized land use classifications represent broad land use patterns and relationships between uses. As applied in this EA, generalized land use classifications concentrate land use subclasses or similar land use classifications. For example, 'Residential' includes land use subclasses such as single family, multi-family, and manufactured housing. Additionally, 'Vacant/Undeveloped' includes similar land use classifications of agricultural, vacant land, and forested and conservation lands.

3.6.4.2 National Wildlife Refuges

The Wallops Island National Wildlife Refuge is located southeast of WFF Main Base, and under Alternative 2, Scenario 1, the 65 dB DNL noise zone extends over a portion of the refuge. The Wallops Island National Wildlife Refuge is not utilized extensively by the public, with the primary use being limited hunting activities through a lottery system. Public usage of the refuge would not be significantly impacted by the proposed action. Additionally, the sea-level fen habitat located within the refuge would not be impacted by the proposed action.

3.6.4.3 Land Use Compatibility Impact Conclusion

Based upon the land use compatibility analysis and the compatibility with local land use controls, there would be no significant direct or indirect impact to land use as a result of implementation of Alternative 2, Scenario 1 or 2. There would be an increase of 27.6 or 21.9 acres of land designated as residential use within the modeled noise zones for Scenarios 1 and 2, respectively. This increase in residential land area would be located in areas immediately adjacent to the airport property, primarily in the Trails End community, a private waterfront campground resort zoned for agricultural use, which was built near the end of the WFF Main Base preexisting active runway. The campground is advertised and operated as a temporary lodging/camping resort; therefore, a majority of the residents do not live in the community full-time. This impact would not be considered a significant impact given that the residential area primarily impacted is a transient and seasonal community, the fact that WFF Main Base is an existing, active airfield that currently has 125.7 acres of residential lands within the existing 65 dB DNL or greater noise zone, because the increase in noise would be temporary and intermittent, and the aircraft operations generating the noise would be consistent with the existing operations at WFF.

3.7 Infrastructure and Utilities

The airfield improvements discussed in this EA relate to utilities and concrete pads for equipment. There would be no need for upgrades to the water supply or wastewater treatment system associated with the proposed action; therefore, water supply and wastewater treatment utility infrastructure are not included in this analysis. The study area for this analysis includes the area within the airport property boundaries because this would be where infrastructure and utility upgrades would be needed.

3.7.1 Existing Infrastructure and Utilities at Emporia-Greenville Regional Airport and Wallops Flight Facility

Telephone service to Emporia-Greenville is provided by Verizon Communications, Inc., and can be accessed either at the existing airfield buildings or along James River Junction Road. Mecklenburg Electric Cooperative supplies the electricity to Emporia-Greenville. Austin Energy, a hired contractor, maintains the lighting at the airport, with the exception of minor maintenance that is completed by Vick's Aviation. Electrical service at Emporia-Greenville is available at each end of Runway 15/33.

Telephone service to WFF Main Base is provided by Verizon Communications, Inc. In addition, wireless telephone service is provided by Siemens wherever a landline is unavailable or impractical. A&N Electric Cooperative supplies electricity to WFF Main Base from the Wattsville substation through two aerial feeders. At the WFF Main Base main gate, the power lines transition underground into the facility's main switching station, from which electricity is distributed throughout the facility. The majority of the electrical cables are installed underground and are protected by concrete casing (NASA 2008a).

3.7.2 Impacts on Infrastructure and Utilities at Emporia-Greenville Regional Airport and Wallops Flight Facility

Under the proposed action, no aircraft or squadron personnel would be permanently stationed or homebased at Emporia-Greenville or WFF Main Base, and there would be no construction of personnel support facilities for Navy personnel under either alternative. In a detachment situation at WFF, personnel would be supported in existing Navy housing and in local motels and hotels with existing available utility capacity. For each alternative, telephone service would be needed for LSO workstations, and electricity would be needed for the LSO workstation, IFLOLS, MOVLAS, simulated carrier box lighting, lighted windsock/tetrahedron, and abeam position light. Lines would be entrenched from the point of connection to the existing grid to each piece of equipment. No trenching or infrastructure upgrades would occur outside of the airport property boundaries.

At Emporia-Greenville, telephone service would continue to be provided by Verizon Communications, Inc., and the electricity would continue to be supplied by Mecklenburg Electric Cooperative. Both telephone and electric service needs would be met utilizing existing service capacity. No additional capacity would be required for the proposed action. For the LSO station on Runway 15, the telephone and electrical lines would be entrenched from an existing line along the James River Junction, the public road along the western side of the airfield boundary (see Figure 2-11). For the LSO station on Runway 33, the telephone line would be entrenched from the airport hangar, and the electrical line would be entrenched from an existing electrical power vault near the airport's administration building (see Figure 2-12).

At WFF Main Base, telephone service would continue to be provided by Verizon Communications, Inc., or Siemens, as appropriate, and A&N Electric Cooperative would continue to supply the electricity. Both telephone and electric service needs would be met utilizing existing service capacity. No additional capacity would be required for the proposed action. Phone lines would be entrenched from the point of their connection to each LSO workstation, and electrical lines would be entrenched from existing connections to the A&N Electric Cooperative feeder.

The new telephone and electrical lines at Emporia-Greenville or WFF Main Base would continue to operate within existing capacity; therefore, there would be no significant impact on telephone services.

3.8 Visual Landscape: Light Emissions and Visual Impacts

The study area for the visual landscape is the viewshed of the airport properties at Emporia-Greensville and WFF Main Base.

3.8.1 Existing Visual Landscape at Emporia-Greensville Regional Airport and Wallops Flight Facility

Emporia-Greensville is adjacent to a primary highway (U.S. Route 58) traversing a rural area of Virginia. The visual landscape is flat and dominated by farm fields and stands of woods. U.S. Route 58 does not have streetlights in this area. The airport is lit with aircraft navigational lights, including runway threshold and edge lights, runway end identifier lights at both ends of Runway 15/33, and several red obstruction lights at various points. Emporia-Greensville currently experiences an estimated 2,320 annual aircraft operations, including both propeller aircraft and military helicopter operations.

WFF Main Base is in a flat, rural area. The visual landscape is composed of farm fields, stands of woods, and clusters of residential developments. There are businesses along a few primary roads, larger commercial entities such as some chain grocery stores and restaurants along U.S. Route 13, and smaller businesses such as locally owned restaurants along Virginia State Route 175 (Chincoteague Road). WFF Main Base is lit with aircraft navigational lights and currently experiences an estimated 13,074 annual aircraft operations, primarily including propeller and jet aircraft.

3.8.2 Impacts on the Visual Landscape at Emporia-Greensville Regional Airport and Wallops Flight Facility

Some new infrastructure would be installed at Emporia-Greensville or WFF Main Base, including the installation of concrete pads with Navy equipment placed on them, the painting of a simulated carrier deck (with associated flush lighting installed along it) at the ends of the runways, and the placement of an LSO workstation at the end of each runway. During FCLP training, the existing airport runway lights would be turned off, and only the flush carrier deck box lighting would be used. No increase in off-site lighting would be projected from either airfield. Due to the topography of the sites, little lighting from FCLP operations would be visible beyond either airport. Therefore, these airfield-associated modifications would be consistent with the current visual setting of both airfields.

The communities surrounding both Emporia-Greensville and WFF Main Base are generally accustomed to seeing aircraft operating in the area, as both communities are near active airfields. At Emporia-Greensville, the community is generally accustomed to seeing both propeller aircraft and military helicopter operations. At WFF Main Base, E-2/C-2 aircraft currently operate at the airfield, and the Navy's proposed action would increase the number of operations. A portion of these operations would take place after sunset. Therefore, although there would be an increase in the total number of operations, the Navy conducting temporary, intermittent FCLP with E-2/C-2 aircraft would not be a significant impact.

3.9 Geology, Topography, and Soils

The study area for this analysis includes the area within the airport property boundaries, as all construction activities would occur within this area.

3.9.1 Existing Geology, Topography, and Soils at Emporia-Greensville Regional Airport and Wallops Flight Facility

Both Emporia-Greensville and WFF Main Base are located within subdivisions of the Virginia Coastal Plain Physiographic Province. Emporia-Greensville is located within the Southern Coastal Plain, and WFF Main Base is located within the Outer Coastal Plan (Wilson and Tuberville 2003). The entire Virginia Coastal Plain consists of a series of terraces sloping downward toward the coast and is generally characterized by low topographic relief, extensive marshes, and large, tidally influenced rivers. Elevation within the Virginia Coastal Plain ranges from sea level to approximately 250 feet mean sea level (Bailey 1999).

Although the overall geological features of Emporia-Greensville and WFF Main Base are similar, the topography and soil characteristics are slightly different and discussed separately.

Emporia-Greensville

Topography at Emporia-Greensville is flat to gently sloping, with elevations ranging from approximately 125 feet to 147 feet mean sea level (Browning and Chaffman 2011).

Emporia-Greensville is located within the Bacons Castle Formation, which consists of gray, yellowish-orange, and reddish-brown sand, gravel, silt, and clay (USGS n.d.). Seventeen soil types occur at Emporia-Greensville (USDA NRCS n.d. [a], n.d. [b]). More than 50 percent of the soils, including most of the area surrounding the runway, is identified as Udorthents, smoothed, 0 percent to 25 percent slopes, a non-hydric soil. Four of the 17 soil types are classified as hydric soils. Hydric soils are identified within approximately 13 percent of the airport property (USDA NRCS n.d. [c]).

Wallops Flight Facility

The majority of WFF Main Base is located on a high terrace landform with elevations ranging from 25 to 40 feet mean sea level (NASA 2011c). The northern and eastern portions are located on low terraces and tidal marshes; elevations in these areas range from 0 to 25 feet mean sea level.

WFF Main Base occurs within three geologic units: Omar Formation—Accomack Member, Marsh and Intertidal Mud Deposits, and Joynes Neck Sand (USGS 2012), which are all generally composed of sedimentary deposits of sand, gravel, silt, clay, and peat. Eleven soil types occur at WFF Main Base (USDA NRCS n.d. [d]). More than 89 percent of the soils at the facility are identified as three soil types: Bojac fine sandy loam, 0 percent to 2 percent slopes; Molena loamy sand, 6 percent to 35 percent slopes; and Chincoteague silt loam, 0 percent to 1 percent slopes, frequently flooded. The majority of the runway area occurs

on Bojac fine sandy loam. Five of the 11 soil types are classified as hydric soils, which are identified in approximately 19 percent of the facility property (USDA NRCS n.d. [e]).

3.9.2 Impacts on Geology, Topography, and Soils at Emporia-Greenville Regional Airport and Wallops Flight Facility

At Emporia-Greenville or WFF Main Base, no deep excavations that would impact underlying geology would be required for construction of the concrete pads and asphalt storage area or for installation of underground utility lines. Therefore, there would be no significant impact on geology.

All construction at Emporia-Greenville or WFF Main Base would take place in areas with little to no topographic relief. Some minor excavations would be required for placement of underground utility lines; however, elevations in the area would remain generally unchanged. Therefore, there would be no significant impact on topography.

Minor construction at Emporia-Greenville or WFF Main Base could expose soils to wind and stormwater erosion, compaction, and rutting. These impacts would be minimized, or avoided altogether, by using standard soil erosion and sedimentation controls, best management practices, and appropriate revegetation techniques upon completion of construction. Therefore, there would be no significant impact on soil resources.

3.10 Water Resources

3.10.1 Existing Water Resources at Emporia-Greenville Regional Airport

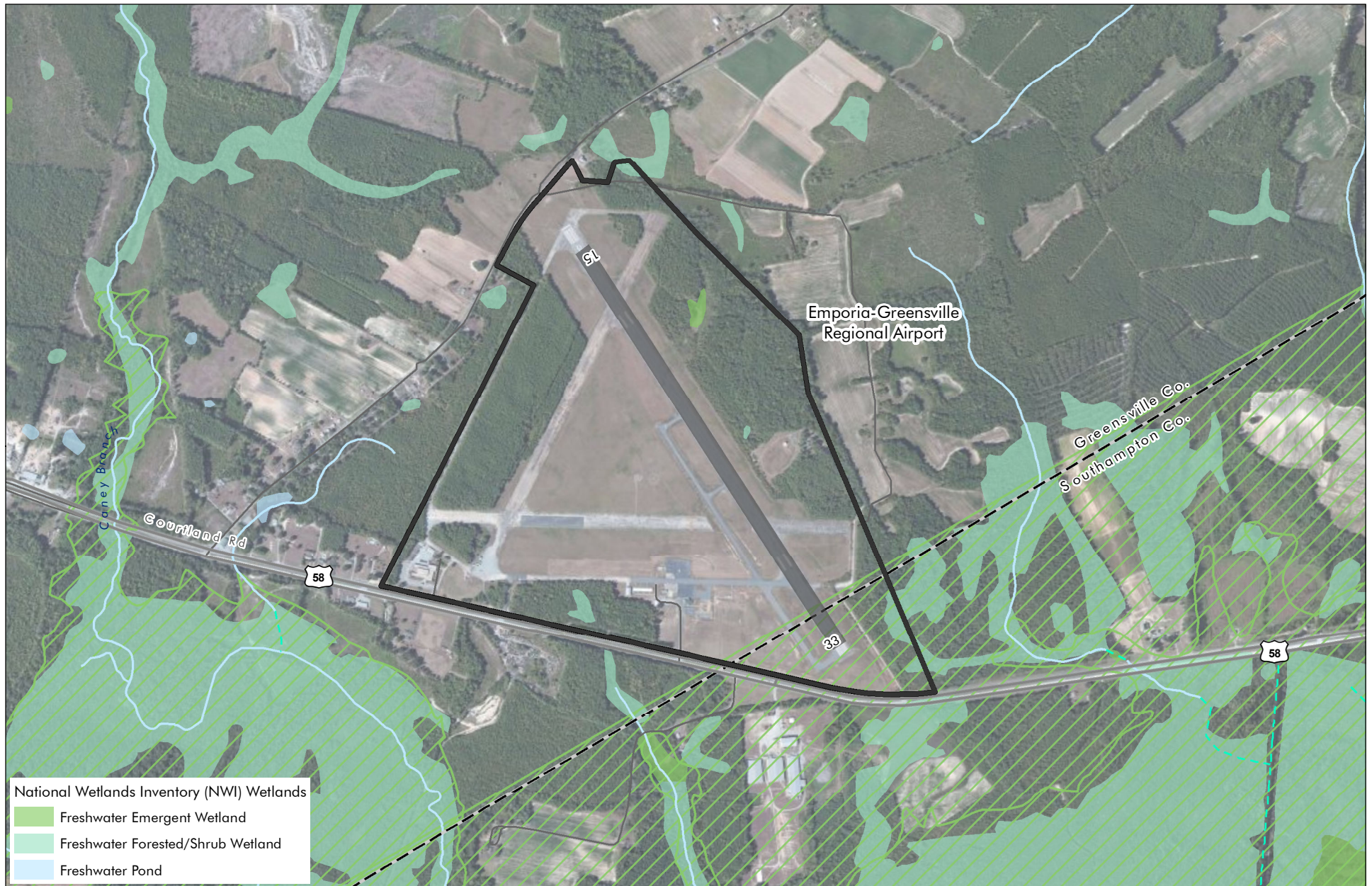
The study area for surface waters, floodplains, wetlands, and stormwater management at Emporia-Greenville is the area contained within the airport property boundary. The proposed action would not have an impact on wild and scenic rivers; therefore, these resource areas are not included in this analysis.

3.10.1.1 Surface Waters

No surface waters exist within the boundary of Emporia-Greenville (County of Greenville, Virginia, and K. W. Poore & Associates, Inc., 2008). Drainage from the airport primarily occurs through overland sheet flow and roadside drainage ditches (Mill Creek Environmental Consultants, Ltd., 2011). Water draining from the airport eventually flows into Caney Branch, approximately 0.3 mile to the southwest, and Three Creek, approximately 1.5 miles to the north.

3.10.1.2 Floodplains

The southern portion of Emporia-Greenville is located in a zone with a 1 percent annual chance of flooding—i.e., within the 100-year floodplain (Figure 3-20).



Source: ESRI 2010; Federal Emergency Management Agency 2011; National Hydrography Dataset; USFWS.

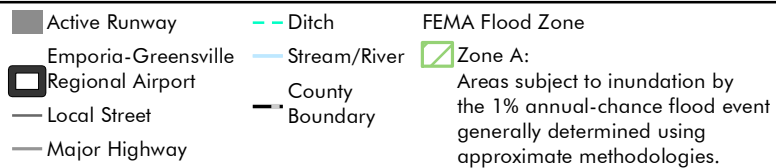
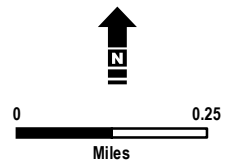


Figure 3-20
Water Resources
Emporia-Greenville Regional Airport



3.10.1.3 Wetlands

Wetlands at Emporia-Greenville were identified using the USFWS National Wetlands Inventory (USFWS 2011a). Five wetlands, encompassing approximately 5.2 acres, have been identified by the National Wetlands Inventory at the airport (see Figure 3-20 and Table 3-28). Approximately 1 acre has been identified as freshwater emergent wetland. This wetland type is typically dominated by herbaceous (i.e., non-woody) vegetation and is usually dominated by perennial plants that are present for most of the growing season in most years (USFWS 2011c). Approximately 4.2 acres have been identified as freshwater forested wetland. This wetland type is characterized by woody vegetation that is at least 6 meters tall (USFWS 2011c). Most of the wetlands occur along the periphery of the airport, but two small wetland areas occur in the forested area east of the runway (Figure 3-20). The Navy conducted an initial site visit to Emporia-Greenville on December 30, 2011, followed by meeting with a USACE regulator on April 27, 2012, and August 29, 2012, to review the presence of potential wetlands in the vicinity of the proposed airfield modifications. During the visits, it was determined that no jurisdictional wetlands occur in the vicinity of the proposed airfield modifications (Evans 2012a,b).

Table 3-28 Emporia-Greenville Regional Airport National Wetlands Inventory Wetlands

Wetland Type	Acres
Freshwater Emergent Wetland	1.01
Freshwater Forested/Shrub Wetland	4.15
Total	5.16

Source: USFWS 2011a

3.10.1.4 Stormwater Management

Emporia-Greenville Regional Airport maintains a Stormwater Pollution Prevention Plan, last updated in October 2009, to ensure that its operations have minimal impact on stormwater quality (Emporia-Greenville Regional Airport 2009). This plan also contains best management practices for construction activities that do not exceed 1 acre. The airport has a Virginia Pollutant Discharge Elimination System permit that allows aircraft operations, storage, fueling, and maintenance.

The existing stormwater management system at Emporia-Greenville was installed by the USACE in 1942 (Emporia-Greenville Regional Airport 2004). The system includes a series of catch basins and open ditches that direct runoff away from paved areas to seven stormwater outfalls located along the airport property line (Emporia-Greenville Regional Airport 2009). The receiving waters for the airport include Three Creek to the north and Caney Branch to the west and southwest. Unpaved areas are grassed to prevent erosion.

3.10.2 Impacts on Water Resources at Emporia-Greenville Regional Airport

3.10.2.1 Surface Waters

As stated in Section 3.10.1.1, no surface waters exist within the boundary of Emporia-Greenville. Therefore, under Alternative 1 there would be no direct impacts on surface water from construction of concrete pads or installation of underground utility lines. In order to avoid or minimize potential impacts on water quality from sediment runoff during construction, an Erosion and Sediment Control Plan and best management practices would be incorporated into the construction design and implementation. Because of these minimization measures, no indirect impacts on surface waters would occur. There would be no significant impact on surface waters.

3.10.2.2 Floodplains

Although floodplains are present at Emporia-Greenville, no construction would occur within these floodplains under Alternative 1. Therefore, Alternative 1 would have no direct or indirect impacts on floodplains. There would be no significant impact to floodplains.

3.10.2.3 Wetlands

Under Alternative 1, no new construction is proposed within wetlands (see Figure 3-20). Therefore, there would be no direct impacts on wetlands under Alternative 1. Non-point-source water pollution will be minimized during construction through proper erosion and sediment control measures, including best management practices (BMPs). Therefore, no indirect impacts on wetlands would occur under Alternative 1. There would be no significant impact to wetlands.

3.10.2.4 Stormwater Management

Under Alternative 1, new impervious surfaces (i.e., concrete pads and the fenced storage area) would be constructed (see Figure 2-11 and Figure 2-12). Construction of the pads and fenced storage area would create approximately 0.02 acre and 0.41 acre, respectively, of new, completely impervious surface, for a total of 0.43 acre of new impervious surface under Alternative 1.

The proposed construction would disturb less than 1 acre; therefore, a storm water construction permit and Stormwater Pollution Prevention Plan would not be required. However, an Erosion and Sediment Control Plan would be necessary because the land disturbance would exceed 10,000 square feet (0.23 acre). As a result, Alternative 1 would have no significant impacts on stormwater.

3.10.3 Existing Water Resources at Wallops Flight Facility

The study area for surface waters, floodplains, wetlands, and stormwater management at WFF Main Base is the area contained within the airport property boundary. The proposed action would not have an impact on wild and scenic rivers, so this resource area is not included in this analysis.

3.10.3.1 Surface Waters

There are approximately 37,840 linear feet of surface waters on WFF Main Base (Figure 3-21). Wattsville Branch traverses the facility west of Runway 10/28. Surface waters on the northern and western portions of the facility flow into Little Mosquito Creek and Wattsville Branch, respectively, while surface waters on the eastern and southern portions of the facility flow to Mosquito Creek, Jenneys Gut, and Simoneaston Bay east of the facility.

3.10.3.2 Floodplains

The northeastern, northern, and northwestern portions of WFF Main Base are located in a zone with a 1 percent annual chance of flooding—i.e., the 100-year floodplain (Figure 3-21).

3.10.3.3 Wetlands

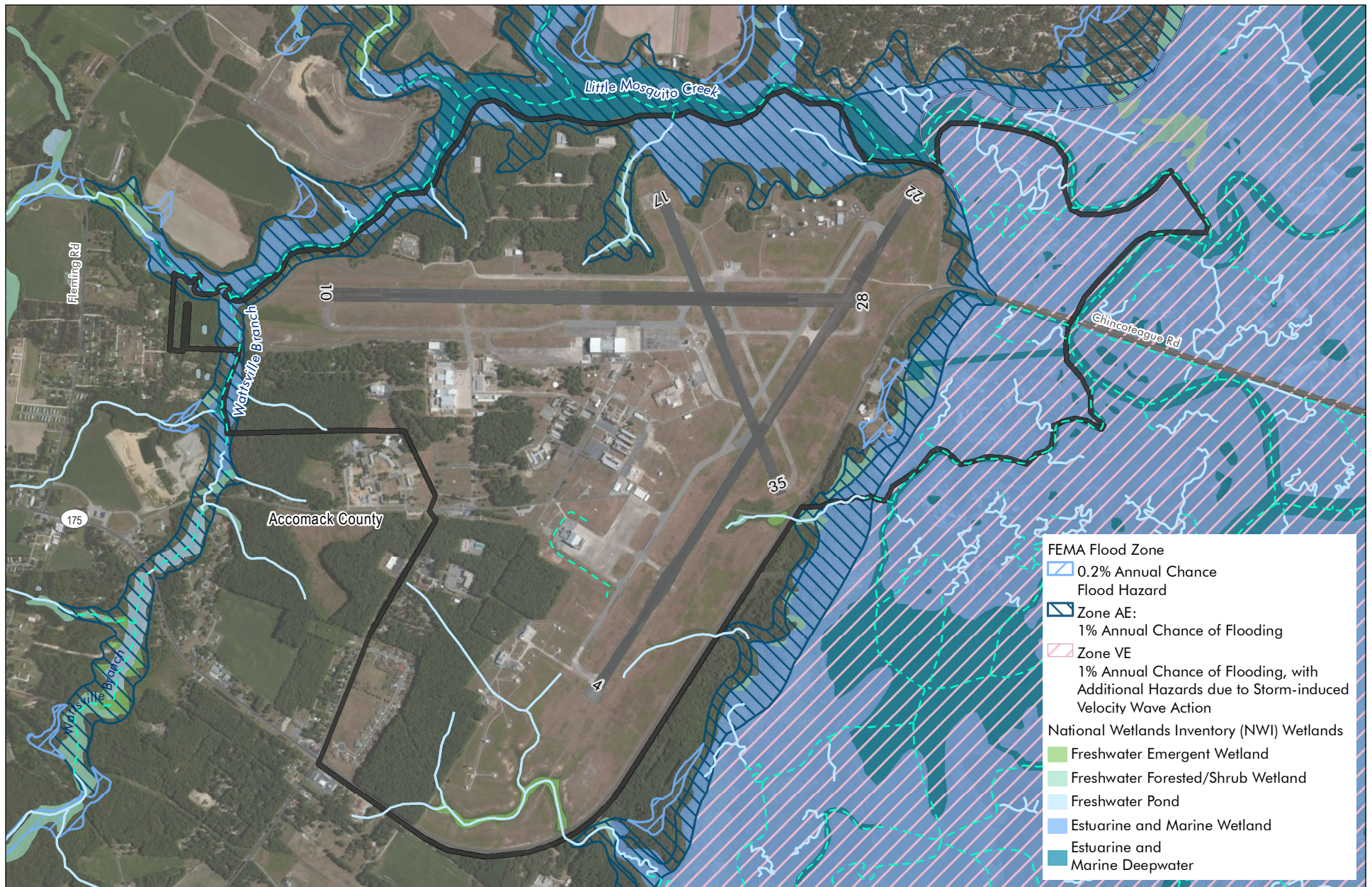
Wetlands at WFF Main Base were identified using the USFWS National Wetlands Inventory (USFWS 2011a). This is consistent with NASA, which also utilizes the National Wetlands Inventory as a baseline reference tool for identifying wetlands. Approximately 376 acres of wetlands, classified into five different wetland types, have been identified by the National Wetlands Inventory at WFF Main Base (Figure 3-21, Table 3-29).

Table 3-29 Wallops Flight Facility Main Base National Wetlands Inventory Wetlands

Wetland Type	Acres
Estuarine and Marine Wetland	331.00
Estuarine and Marine Deepwater	23.16
Freshwater Forested/Shrub Wetland	13.37
Freshwater Emergent Wetland	7.62
Freshwater Pond	0.48
Total	375.63

Source: USFWS 2011a

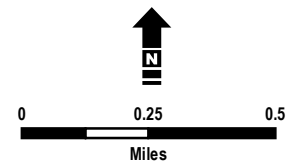
Estuarine and marine wetlands, which typically occur adjacent to deepwater tidal habitats, primarily occur along Wattsville Branch, Little Mosquito Creek, and in the northeastern portion of the facility (USFWS 2011a). The estuarine and marine deepwater habitat is primarily associated with the larger drainages (e.g., Wattsville Branch and Little Mosquito Creek). Freshwater forested/shrub wetlands border some of the smaller drainages in the northern and eastern portions of the facility. Forested wetlands have woody vegetation that is at least 6 meters tall, while shrub wetlands have woody vegetation (e.g., shrubs and saplings) less than 6 meters tall (USFWS 2011a). Freshwater emergent wetlands border some of the smaller drainages in the eastern and southern portions of the facility (USFWS 2011a). This wetland type is typically dominated by herbaceous (i.e., non-woody) vegetation and is usually dominated by perennial plants that are present for most of the growing season in most years (USFWS 2011c). Finally, a small (approximately 0.5 acre) freshwater pond has been identified in the extreme western portion of the facility.



Source: ESRI 2010; Federal Emergency Management Agency 2011; National Hydrography Dataset; USFWS.

- Active Runway
- Local Street
- Wallops Flight Facility
- Ditch
- Major Highway
- Stream/River

Figure 3-21
Water Resources
Wallops Flight Facility



At WFF Main Base, black willow (*Salix nigra*) and red maple dominate the forested wetlands, while wax myrtle (*Morella cerifera*), groundsel (*Baccharis halimifolia*), and black cherry (*Prunus serotina*) dominate the shrub wetlands (NASA 2011a, 2008b). Emergent wetlands and open water occur along the property boundary in the northern portion of the facility (Fry et al. 2011). Plant species occurring in these wetlands include cattail (*Typha latifolia* and *T. angustifolia*), sedges (*Carex* spp.), rushes (*Juncus* spp.), and cordgrass (*Spartina alterniflora* and *S. patens*) (NASA 2008a).

3.10.3.4 Stormwater Management

WFF maintains a Stormwater Pollution Prevention Plan, last updated in April 2009, to ensure that its operations have minimal impact on stormwater quality (NASA 2009a). The airfield is covered by a Virginia Pollutant Discharge Elimination System permit that allows industrial activities at WFF that include airfield operations and space vehicle parts manufacturing. No aircraft de-icing is conducted at the facility (NASA 2009a).

WFF Main Base has both natural drainage patterns and stormwater swales and drains to intercept and divert flow. The facility contains 12 industrial stormwater outfalls, four non-industrial stormwater outfalls, and one Federally Owned Treatment Works process outfall (NASA 2009a). All stormwater from WFF Main Base eventually flows to the Atlantic Ocean. Stormwater drains to Little Mosquito Creek from the northern portion of the facility; Mosquito Creek, Jenneys Gut, and Simoneaston Bay from the eastern and southeastern portions of the facility; and Wattsville Branch on the western and southwestern portions of the facility. Stormwater inlets on WFF Main Base intercept runoff and divert the flow to numerous discharge locations. WFF Main Base outfalls are protected with rip-rap to reduce flow velocity and minimize damage to the receiving waterways. In addition to the stormwater management system, sediment and erosion control measures are implemented to control runoff from construction, demolition, restoration, and site maintenance projects. Current best management practices employed for stormwater management and erosion and sediment control include installing silt fences, utilizing stone construction vehicle entrances, maintaining vegetative buffer strips, and quickly reseeding bare soils.

3.10.4 Impacts on Water Resources at Wallops Flight Facility

3.10.4.1 Surface Waters

Under Alternative 2, there would be no direct impacts on surface waters from construction of concrete pads or installation of underground utility lines. In order to avoid or minimize potential impacts on water quality from sediment runoff during construction, an erosion and sediment control plan and best management practices would be incorporated into the construction design and implementation. Because of these minimization measures, no indirect impacts on surface waters would occur. There would be no significant impact to surface waters.

3.10.4.2 Floodplains

Although floodplains are present at WFF Main Base, no construction would occur within floodplains under Alternative 2, resulting in no direct or indirect impacts on floodplains. There would be no significant impact to floodplains.

3.10.4.3 Wetlands

Under Alternative 2, no new construction is proposed within wetlands (see Figure 3-21). Therefore, there would be no direct impacts on wetlands under Alternative 2. Non-point-source water pollution, which could result from new surface runoff from the concrete pads carrying contaminants or sediment into nearby wetlands, will be minimized during construction through proper erosion and sediment control measures, including best management practices. Therefore, no indirect impacts on wetlands would occur under Alternative 2. There would be no significant impact to wetlands.

3.10.4.4 Stormwater Management

Under Alternative 2, the proposed airfield modification would include the construction of new impervious surfaces (i.e., concrete pads). Construction of new impervious surfaces under Alternative 2 would result in a maximum addition of 0.05 acre of impervious surface. This acreage may be reduced as a result of some of the pads being placed on existing impervious surface associated with the runway shoulders. The three main runways at WFF Main Base have approximately 79 acres of impervious surfaces, not including the numerous taxiways, aircraft parking aprons, and other concrete or asphalt surfaces associated with them. Therefore, the addition of a maximum of 0.05 acre of impervious surfaces associated with Alternative 2 would increase the overall impervious surface at WFF Main Base by about 0.06 percent.

Because of the small addition of new impervious surfaces, the Navy's proposed action and related construction would not significantly contribute to additional stormwater discharge to surface waters at and surrounding WFF. WFF would not be required to update its Stormwater Pollution Prevention Plan. Under Alternative 2, construction would disturb less than one acre; therefore, a Stormwater Pollution Prevention Plan would not be required. Additionally, where construction-related land disturbance would be less than 10,000 square feet (0.23 acre), the Navy would not be required to submit a formal erosion and sediment control plan. However, the Navy would still coordinate with NASA during design and construction to ensure that appropriate best management practices are implemented. Additionally, the Navy would follow all additional WFF permit requirements and standard operating procedures during construction and maintenance of proposed infrastructure to control/reduce stormwater runoff and minimize potential adverse effects. Therefore, Alternative 2 would have no significant impacts on stormwater.

3.11 Biological Resources

3.11.1 Existing Biological Resources at Emporia-Greenville Regional Airport

The study area for vegetation at Emporia-Greenville is the area contained within the airport property boundary, as this is the location of the proposed airfield modifications. The study area for all wildlife, including federal and state threatened and endangered species, includes the area within the modeled 65 dB DNL and greater noise contour, as potential impacts associated with aircraft noise can travel beyond the airport property.

3.11.1.1 Vegetation

Approximately 226 acres of the Emporia-Greenville property have been classified as developed, 91 acres as forested, and 39 acres as open habitats by the USGS 2006 National Land Cover Database (Fry et al. 2011). Additionally, wetlands have been classified on the airport property (see Section 3.10.1.3, Wetlands). The National Land Cover Database is a detailed land surface reference based on Landsat satellite images. With the exception of forested areas around the periphery of the airport property, the majority of the airport is either developed (i.e., paved) or grasslands maintained through regular mowing (Figure 3-22). The forested areas at the airport contain both pine and deciduous species, including red maple (*Acer rubrum*), American holly (*Ilex opaca*), sweetgum (*Liquidambar styraciflua*), paper birch (*Betula papyrifera*), loblolly pine (*Pinus taeda*), sweetbay (*Magnolia virginiana* L.), and various species of oak (*Quercus spp.*) (Bland n.d.). Correspondence from the Virginia Department of Conservation, Division of Natural Heritage, indicates that no natural heritage resources occur in proximity to Emporia-Greenville (see Appendix A, Agency Consultation).

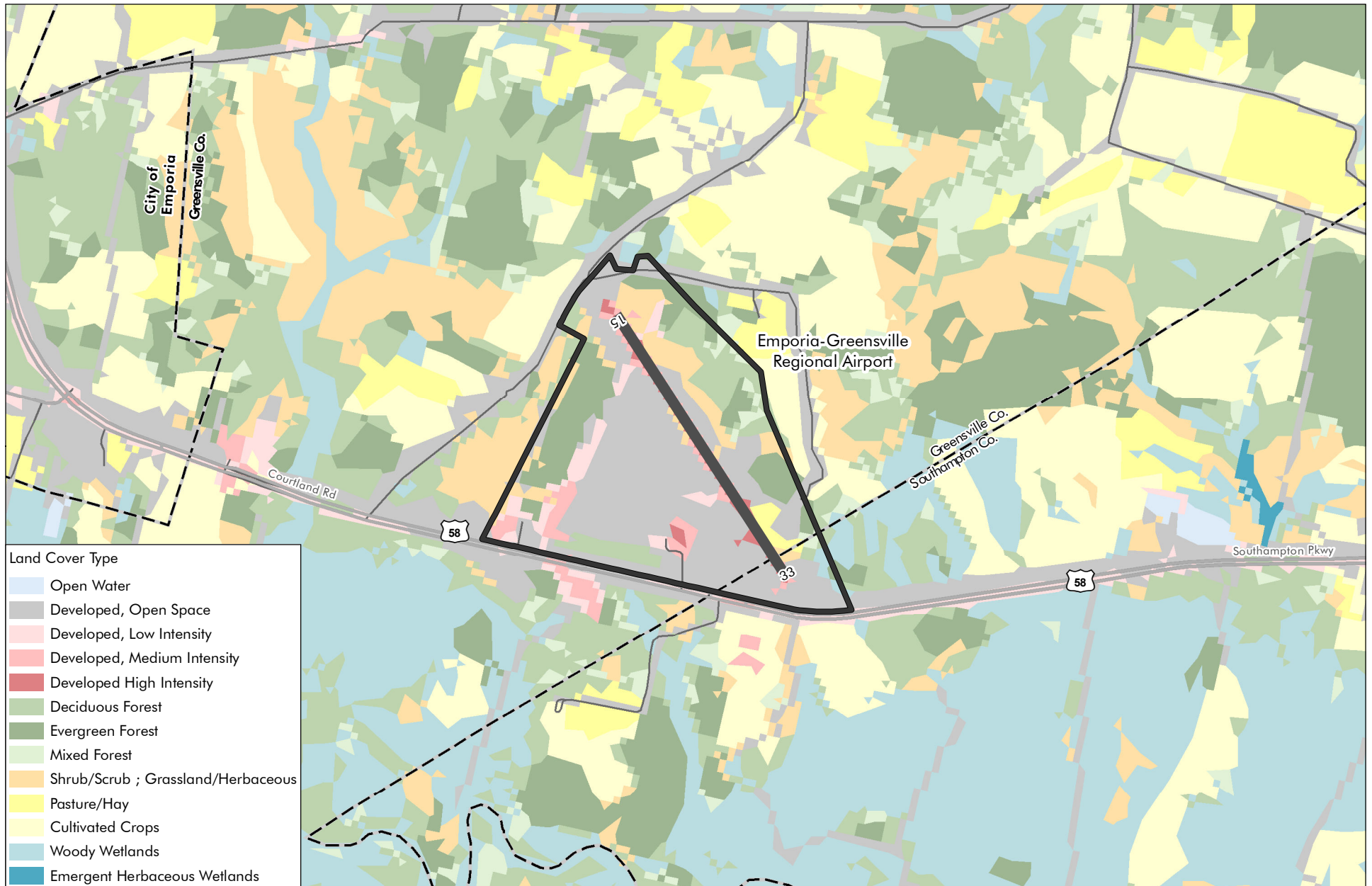
3.11.1.2 Marine Mammals, Birds, and Other Wildlife

Marine Mammals

Emporia-Greenville is located inland, and no marine environments exist around the airport; therefore, no marine mammals are or could be present.

Birds

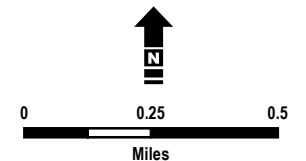
Bird species occurring at Emporia-Greenville likely include those commonly found in forested, edge, and open habitats on the Coastal Plain of Virginia. Avian species richness would likely be higher in the areas surrounding the airport, particularly along Three Creek and the Meherrin River. A total of 46 bird species were documented during the 1985 to 1989 Breeding Bird Atlas across three survey blocks (50024, 51024, and 51025) in the vicinity of the airport (Breeding Bird Atlas Explorer 2012).



Source: ESRI 2010; USGS NLCD 2006.

- Active Runway
- Emporia-Greenville Regional Airport
- County Boundary
- Major Highway
- Local Street

Figure 3-22
Land Cover Types in the Vicinity of
Emporia-Greenville Regional Airport



Waterfowl (e.g., ducks, geese, and swans) would be unlikely to occur at the airport due to a lack of suitable habitat. Waterbirds (e.g., herons and egrets) could occur on occasion in the emergent wetland area east of the runway. Colonial waterbird colonies supporting great blue herons (*Ardea herodias*) and great egrets (*Ardea alba*) historically occurred along Three Creek and the Meherrin River (VDGIF FWIS 2012b). One colony has been documented along Three Creek, and three colonies have been documented along the Meherrin River. The closest colony was approximately 2 miles from the airport boundary. None of these colonies has been documented since 2003, and their current status is not known.

Raptor species, including the black vulture (*Coragyps atratus*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), red shouldered-hawk (*Buteo lineatus*), and American kestrel (*Falco sparverius*) may occur throughout the year. Bald eagles would likely be limited to transient individual birds; no bald eagle nests have been documented in the vicinity of the airport (Watts and Byrd 2011a). The wild turkey (*Meleagris gallopavo*), northern bobwhite (*Colinus virginianus*), killdeer (*Charadrius vociferus*), rock pigeon (*Columba livia*), and mourning dove (*Zenaida macroura*) could occur on the airport property. Common woodpecker species such as the red-bellied woodpecker (*Melanerpes carolinus*), downy woodpecker (*Picoides pubescens*), and northern flicker (*Colaptes auratus*) are also likely present. Passerines (i.e., songbirds) would likely be the most diverse and abundant avian species group occurring at the airport. Common species would likely include the blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), Carolina chickadee (*Poecile carolinensis*), Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), northern cardinal (*Cardinalis cardinalis*), eastern meadowlark (*Sturnella magna*), and red-winged blackbird (*Agelaius phoeniceus*). The white-throated sparrow would likely be a common winter resident, while the remaining observed species would likely be present throughout the year. For information on how Emporia-Greenville currently manages potential bird/animal aircraft strike hazards, or BASH, refer to Section 3.3.1.1.

Other Wildlife

Emporia-Greenville is likely to support wildlife species commonly found in the region. Less-fragmented habitats north and south of the airport along Three Creek and the Meherrin River, respectively, likely support a larger diversity of wildlife species. Large mammals potentially occurring include the white-tailed deer, gray fox (*Urocyon cinereoargenteus*), and red fox (*Vulpes vulpes*) (VDGIF FWIS 2012a). Small mammals could include the gray squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), eastern cottontail (*Sylvilagus floridanus*), eastern chipmunk (*Tamias striatus*), marsh rice rat (*Oryzomys palustris*), Kirtland's short-tailed shrew (*Blarina brevicauda kirtlandi*), and southern short-tailed shrew (*Blarina carolinensis*), as well as other species of mice, moles, and shrews. Amphibians potentially occurring include the oak toad (*Anaxyrus quercicus*), pine woods treefrog (*Hyla femoralis*), squirrel treefrog (*Hyla squirella*), northern redback salamander (*Plethodon cinereus*), eastern coastal plain cricket frog (*Acris gryllus gryllus*), Cope's gray tree frog (*Hyla chrysoscelis*), northern spring peeper

(*Pseudacris crucifer*), southern chorus frog (*Pseudacris nigrita*), American toad (*Bufo americanus*), Fowler's toad (*Anaxyrus fowleri*), and red-spotted newt (*Notophthalmus viridescens*). Cricket frogs (*Acris* spp.), the green frog (*Lithobates clamitans*), and the bull frog (*Lithobates catesbeianus*) were documented at the airport during a site visit on July 19, 2011 (E & E 2011). Numerous species of lizards and snakes could also occur (VDGIF FWIS 2012a). A rough earth snake (*Virginia striatula*) was documented at the airport during a site visit on July 19, 2011 (E & E 2011).

3.11.1.3 Protected Species

The VDGIF's Wildlife Environmental Review Map Service and the USFWS's Information, Planning, and Conservation System databases were searched to identify federally threatened and endangered species under USFWS jurisdiction potentially occurring within or in the vicinity of Emporia-Greenville (VDGIF 2012, USFWS 2012a). The original action area searched in the databases outlined the modeled 65 dB DNL and greater noise contour. In response to public and agency comments on the Draft EA, the action area was expanded to include the FCLP and holding pattern and the 65 dB DNL and greater noise zone. Species identified as potentially occurring in the action area, using the expanded search criteria, were the same as those found under the original noise zones, which are presented in Table 3-30.

Table 3-30 Federally Threatened and Endangered Species Potentially Occurring at or in the Vicinity of Emporia-Greenville Regional Airport

Common Name	Scientific Name	Federal ESA Status
Birds		
Red-cockaded Woodpecker	<i>Picoides borealis</i>	Endangered
Fishes		
Roanoke Logperch	<i>Percina rex</i>	Endangered
Plants		
American Chaffseed	<i>Schwalbea americana</i>	Endangered
Michaux's Sumac	<i>Rhus michauxii</i>	Endangered

Source: USFWS 2012a.

Red-cockaded Woodpecker

The red-cockaded woodpecker (*Picoides borealis*) is listed as an endangered species both federally and by the Commonwealth of Virginia (VDGIF FWIS 2012b). No critical habitat has been designated for the red-cockaded woodpecker. Within Virginia, the red-cockaded woodpecker is known to occur at only one location, The Nature Conservancy's Piney Grove Preserve, in Sussex County, which is approximately 28 miles northeast of Emporia-Greenville (VDGIF 2005). The red-cockaded woodpecker is unlikely to occur in the vicinity of Emporia-Greenville because no suitable habitat, such as mature, live pine trees in open pine savannas/barrens, is present.

Roanoke Logperch

The Roanoke logperch (*Percina rex*) is listed as endangered both federally and by the Commonwealth of Virginia (VDGIF FWIS 2012b). No critical habitat has been designated for the Roanoke logperch. In Virginia, the species is found only in the Roanoke and Nottoway river systems (VDGIF 2005). There are no river reaches in the vicinity of Emporia-Greensville where the Roanoke logperch has been confirmed to occur; however, Three Creek, located 1.5 miles north of the airport, has been identified by VDGIF as a river reach where the species could potentially occur (VDGIF 2005).

American Chaffseed

The American chaffseed (*Schwalbea americana*), a perennial flowering herb, is listed as a federally endangered species (VDGIF FWIS 2012b). No critical habitat has been designated for the American chaffseed. American chaffseed typically requires fire for persistence and occurs in fire-maintained ecosystems, such as longleaf pine wiregrass ecosystems; open, moist pine flatwoods; and fire-maintained savannas (USFWS 1995). The USFWS indicates that American chaffseed is known or believed to occur in the City of Emporia and Greensville and Sussex counties (USFWS 2012b).

Michaux's Sumac

Michaux's sumac (*Rhus michauxii*), a shrub, is listed as an endangered species both federally and by the Commonwealth of Virginia (VDGIF FWIS 2012b). No critical habitat has been designated for Michaux's sumac. It typically grows on sandy soils in forest openings or thin woods and is dependent on disturbance to maintain the openness of its habitat. Only two populations of Michaux's sumac are known in Virginia; one is on the Fort Pickett Military Reservation in Nottoway and Dinwiddie counties, and the second is at a site adjacent to Fort Pickett (USACE, Construction Engineering Research Laboratories 1998; Virginia Natural Heritage Program 2011). Fort Pickett is more than 30 miles from Emporia-Greensville.

A list of additional, non-federally listed species listed by Virginia as threatened or endangered potentially occurring within or in the vicinity of Emporia-Greensville was developed through database searches of VDGIF's Wildlife Environmental Review Map Service and written correspondence to the VDCR, Division of Natural Heritage (Baird 2012, VDGIF 2012). The database searches covered an area encompassing the modeled 65 dB DNL noise contour. The search indicated that there are no known occurrences of additional state-listed threatened or endangered species within the area encompassing the modeled 65 dB DNL noise contour around Emporia-Greensville.

3.11.2 Impacts on Biological Resources at Emporia-Greensville Regional Airport**3.11.2.1 Vegetation**

Under Alternative 1, 0.02 acre of maintained grassland would be permanently removed to construct the concrete pads. No impacts to vegetation would occur from construction of the asphalt storage area (i.e., 0.41 acre) because it would be

constructed in an area that is already paved. Temporary impacts on maintained grassland would occur from installation of buried utility lines. Following installation of the utility lines, the area would be restored to its original condition through grading and replanting of vegetation. Overall, implementation of Alternative 1 would have no significant impact on vegetation. Additionally, Alternative 1 would have no significant impact on natural heritage resources as no such resources occur in proximity to the airport (see Appendix A, Agency Consultation).

3.11.2.2 Marine Mammals, Birds, and Other Wildlife

Marine Mammals

Because Emporia-Greenville is located inland and no marine mammals are or could be present at the site, there would be no impact to marine mammals under Alternative 1.

Birds and Other Wildlife

Construction Impacts. Under Alternative 1, construction of concrete pads and installation of underground utility lines would occur in areas containing maintained grassland. The maintained grassland habitat is unlikely to support many species of wildlife/birds. However, construction of concrete pads and installation of utility lines could result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Construction of concrete pads would permanently remove 0.02 acre of maintained grassland. Following installation of the utility lines, the area would be restored to its original condition, resulting in minor and temporary impacts on wildlife/bird habitat. The asphalt storage area would be constructed in an area of deteriorating pavement, resulting in no impacts on habitat. Temporary displacement of wildlife/birds could occur in peripheral areas during construction, when noise and human activity levels would increase. However, once construction has been completed, wildlife/birds should return. Overall, implementation of Alternative 1 would have no significant impact on wildlife/birds from temporary construction.

Noise Impacts. Several studies have been conducted by the scientific community on the impacts of aircraft noise on wildlife. Overall, the literature suggests that species differ in their response to aircraft noise (Manci et al. 1988). However, individual animals of all species not previously exposed to aircraft noise seem to react with some form of a startle response. The level of response depends on a number of factors, including the life-history characteristics of the species, characteristics of the aircraft and flight activities, habitat type, and the species' previous exposure to aircraft (NPS 1994). The behavioral responses can cause injury and impose an energy response that may affect survival or growth over the long term (Ellis et al. 1991). Additionally, time spent on noise avoidance activity may cause birds to spend less time on necessary activities such as feeding, preening, or caring for young (NPS 1994).

It has been widely reported in the scientific literature that the intensities and durations of the startle response decrease with the number and frequency of exposures. Several studies indicate a strong tendency for species to acclimate or habituate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Black et al. 1984; Conomy et al. 1998). Other studies have reported physiological responses in birds, such as increased hormonal production and increased heart rates, particularly among nesting species. These physiological responses are almost always accompanied by a behavioral response that can range from a slight change in body position to engagement in escape or avoidance behavior, such as flushing from perches or nests (NPS 1994; Ellis et al. 1991). For mammals, some studies have reported physiological responses, such as increased hormonal production, increased heart rates, and a reduction in milk production, in some species (Manci et al. 1988). The majority of studies, however, have reported short-term or no effects.

Given the current aircraft operations at Emporia-Greenville, most wildlife/birds present at or in the vicinity of the airport would likely be already acclimated to aircraft noise. However, the increase in the acreage of the noise zones greater than 65 dB DNL under Alternative 1 compared to the baseline would likely have minor impacts on wildlife/birds not currently acclimated to these noise levels. Based on the noise studies summarized above, some species may endure longer-term effects due to repeated physiological responses, but most species would be expected to acclimate or habituate to noise exposure after experiencing short-term effects (Grubb and King 1991; Ellis et al. 1991; Black et al. 1984; Conomy et al. 1998). Therefore, noise associated with aircraft operations under Alternative 1 would have no significant impact on wildlife/birds for the duration of the Navy's proposed action.

Strike Impacts. An increase in air operations at Emporia-Greenville due to the Navy's proposed action could result in a minor increase in the potential of an in-air bird strike. To minimize this risk, the Navy has elevated the altitude of the holding pattern to at or above 3,500 feet, since 93 percent of all strikes were found to occur below that altitude (Dolbeer 2006). BASH management would be provided by the airfield at Emporia-Greenville or through a third-party services contract, as needed. An aircrew flying in and around Emporia-Greenville would adhere to flight operations standard operating procedures, using resources such as personnel on the ground to manage BASH exposure during higher risk times of day or migration seasons. For information on how bird and animal hazards would be minimized if the Navy's proposed action were implemented at Emporia-Greenville, refer to Section 3.3.3.2. Given these considerations, there would be no significant impact to birds in flight from the proposed action.

Based on the foregoing, the Navy has also determined that its proposed flight training operations would not result in a significant adverse impact to populations of migratory birds under the Migratory Bird Treaty Act, and the proposed action would not be expected to result in a take or significant impact to bald eagles (see Section 3.11.2.3 for additional discussion of these and other protected species).

3.11.2.3 Protected Species

In response to public and agency comments on the Draft EA, the action area for evaluation of potential impacts to federally threatened and endangered species was expanded to include the FCLP and holding pattern and the 65 dB DNL and greater noise zone. The following federally listed species were evaluated for their potential presence at or in the vicinity of Emporia-Greenville Regional Airport:

Red-cockaded Woodpecker

No suitable habitat for the red-cockaded woodpecker occurs at Emporia-Greenville. In addition, the only known population of the red-cockaded woodpecker in Virginia is located approximately 28 miles from the airport. Therefore, implementation of Alternative 1 would have no effect and no significant impact on the federally endangered red-cockaded woodpecker.

Roanoke Logperch

There are no river reaches in the vicinity of Emporia-Greenville where the federally endangered Roanoke logperch is known to occur; however, Three Creek, located approximately 1.5 miles north of the airport, has been identified as a river reach where the species could potentially occur (VDGIF 2005). No waterbodies would be directly affected by construction under Alternative 1. Additionally, any degradation in water quality from construction would be expected to be minor and highly localized based on implementation of on-site best management practices to reduce and control stormwater runoff. Consequently, implementation of Alternative 1 would have no effect and no significant impact on the federally endangered Roanoke logperch.

American Chaffseed/Michaux's Sumac

Construction under Alternative 1 would only affect maintained grassland and would not impact any habitats where American chaffseed or Michaux's sumac could occur. Therefore, implementation of Alternative 1 would have no effect and no significant impact on the federally endangered American chaffseed or Michaux's sumac.

3.11.3 Existing Biological Resources at Wallops Flight Facility

The study area for vegetation at WFF Main Base is the area contained within the airport property boundary, as this is the location of the proposed airfield modifications. The study area for all wildlife, including federal and state threatened and endangered species, includes the area within the modeled 65 dB DNL and greater noise contour, as potential impacts associated with aircraft noise can travel beyond the airport property.

An area of 1,140 acres of state-owned tidal marsh is located between Wallops Island and Wallops Mainland. A tidal marsh is an area of low-lying wetlands that is influenced by the tides. The marsh is interlaced with small streams known locally as "guts." The marsh itself can be divided into the low marsh and the high marsh—each a distinctive community. The low marsh, which is inundated at high tide, is dominated by saltmarsh cordgrass (*Spartina alterniflora*). The high marsh, which is flooded by approximately 50 percent of the high tides, is dominated by salt meadow cordgrass (*S. patens*). The marshes are of tremendous

importance to marine life and to the terrestrial and avian species that depend on the marshes for their existence (NASA 2005). In addition, the marshes encompass a portion of the area within the proposed noise contours.

3.11.3.1 Vegetation

Approximately 1,217 acres at WFF Main Base has been classified as developed, 287 acres as forested/shrub-scrub, 54 acres as open habitats (i.e., grassland/herbaceous), and 14 acres as open water by the USGS 2006 National Land Cover Database (Fry et al. 2011). Additionally, wetlands have been classified at WFF Main Base (see Section 3.10.3.3, Wetlands). The National Land Cover Database is a detailed land surface reference based on Landsat satellite images. Approximately 63 percent of the facility is open space for runway clear zones or developed areas (Figure 3-23). The area around the runways is maintained as grassland through regular mowing. Forested areas occur in the southwestern and northwestern portions of the facility. Dominant species in upland forests at WFF Main Base include loblolly pine, oaks, hickories (*Carya* spp.), tulip-poplar (*Liriodendron tulipifera*), dogwood (*Cornus florida*), sweetgum, red maple, and sassafras (*Sassafras albidum*).

The Virginia Department of Conservation and Recreation, Division of Natural Heritage, has indicated the occurrence of two conservation sites on WFF Main Base, Little Mosquito Creek Conservation Site and Wallops Island Seeps Conservation Site (see Appendix A, Agency Consultation). The Little Mosquito Creek Conservation Site is designated due to the occurrence of a rare habitat type, Tidal Oligohaline Marsh, while the Wallops Island Seeps Conservation Site is designated due to the occurrence of a rare plant (low frostweed [*Crocianthemum propinquum*]) and a rare habitat type, Coastal Plain/Outer Piedmont Seepage Bog.

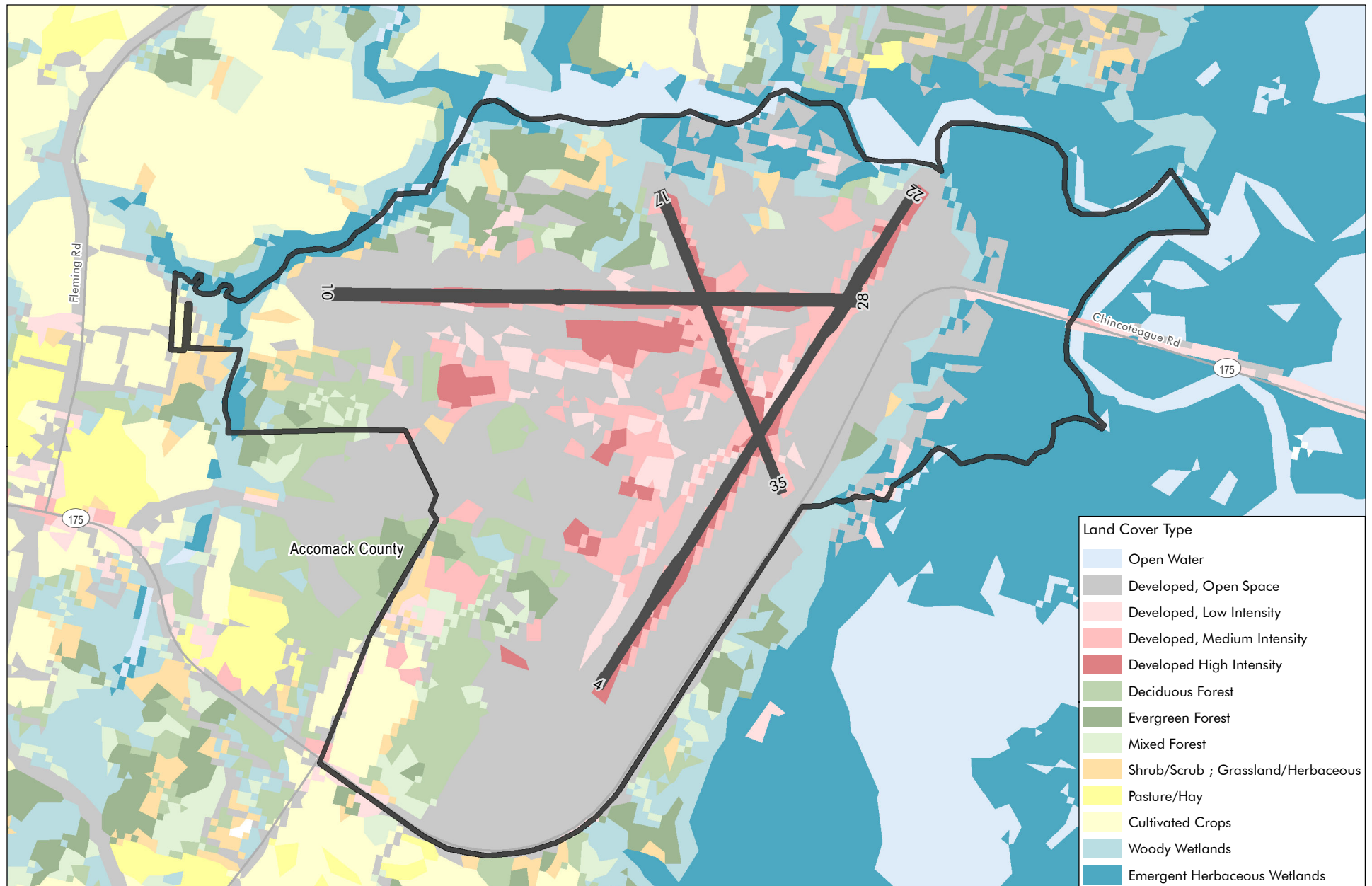
3.11.3.2 Marine Mammals, Birds, and Other Wildlife

Marine Mammals

The only marine mammal species expected to occur in the waters of Chincoteague Bay, located to the northeast of WFF Main Base between the mainland and Chincoteague Island, is the bottlenose dolphin (*Tursiops truncatus*). Bottlenose dolphins could occur in Chincoteague Bay in spring, summer, and fall (Waring et al. 2010). During the winter (January to March), bottlenose dolphins are not likely to be found north of the southern Virginia coastline and would therefore not occur within Chincoteague Bay (Waring et al. 2010).

Birds

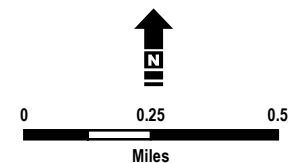
The eastern boundary of WFF Main Base is immediately adjacent to the Audubon Society's Barrier Island/Lagoon System Important Bird Area (see Figure 3-24) (Audubon n.d.). The Important Bird Area program was developed to identify a network of sites that provide critical habitat for birds and to conserve bird species and their habitat. The Barrier Island/Lagoon System Important Bird Area encompasses the seaward margin of the lower Delmarva Peninsula from the mouth of the Chesapeake Bay to the Maryland-Virginia border and, in the vicinity of WFF Main Base, encompasses the Wallops Island National Wildlife Refuge and Chincoteague National Wildlife Refuge. Habitats contained within the



Source: ESRI 2010; USGS NLCD 2006.

Figure 3-23
Land Cover Types in the Vicinity of
 Wallops Flight Facility

Active Runway
 Wallops Flight Facility
 Major Highway
 Local Street





Source: Watts, B. D. and M. A. Byrd 2011. Virginia bald eagle nest and productivity survey: Year 2011 report; USFWS 2012; ESRI 2010.










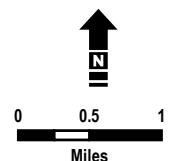
-  Bald Eagle Nest
-  Important Bird Area
-  National Wildlife Refuge
-  Wallops Flight Facility
-  FCLP Flight Tracks
-  Holding Area (at 3,500 feet)
-  Active Runway
-  Major Highway
-  Local Street

Figure 3-24
**Bald Eagle Nests, Important Bird Areas
 and National Wildlife Refuges**
 Wallops Flight Facility



Important Bird Area include barrier islands, maritime forests, salt marshes, intertidal mudflats, and open water. Numerous bird species utilize the habitats within the Important Bird Area, including several at-risk species.

The Wallops Island National Wildlife Refuge was created on July 10, 1975, when NASA transferred 373 acres of land to the USFWS (USFWS n.d. [a]). The National Wildlife Refuge is immediately adjacent to the eastern boundary of WFF Main Base and consists of saltwater marsh, woodland, grassland, and brush habitat. The goals of the refuge are to preserve, enhance, protect, and improve habitat for migratory bird species.

NASA has developed a close relationship with the resource agencies and funds a dedicated BASH team to minimize aircraft hazards. Since 2000, USDA Agriculture Animal and Plant Health Inspection Service, Wildlife Services (Wildlife Services), has conducted annual monitoring at WFF Main Base as part of the facility's Wildlife Hazard Assessment (USDA APHIS WS 2012). During surveys conducted by Wildlife Services from October 2011 through September 2012, a total of 91,763 birds from 82 species were counted, with an average of 1,274 birds observed per survey. The documented birds were grouped into guilds, or species groups, based on the threat they pose to aircraft and aviation safety at the facility (Table 3-31). Wildlife Services also collects data on times of the year that various species are likely flying over or in the vicinity of WFF (NASA 2012).

Additional bird species and numbers data are available from a variety of "citizen science" sources, including the United States Geological Survey (USGS) Breeding Bird Survey and the National Audubon Society Christmas Bird Count. "Citizen scientists" are often highly qualified, but qualifications can also be highly variable.

The USGS Breeding Bird Survey is a long-term avian monitoring program administered by the USGS Patuxent Wildlife Research Center (USGS Patuxent Wildlife Research Center 2001). The Breeding Bird Surveys are route-based point count surveys that are repeated over a long period of time to show population trends and relative abundance of bird species (USGS Patuxent Wildlife Research Center 2001). These surveys are conducted during the primary breeding season for most bird species, or June throughout most of the United States. The data in Table 3-32 show the 10 most abundant species on the Breeding Bird Survey route 88916 (approximately 24.5 miles long) located near WFF (Sauer et al. 2011). The data (average from 1966 to 2010) show that, on average along this route, 3.5 times more laughing gulls (*Larus articalia*) are observed per survey than the next most abundant species, the common grackle (*Quiscalus quiscula*).

Table 3-31 Species Guilds and Percent of Birds Counted during Surveys from October 2011 through September 2012 at Wallops Flight Facility Main Base

Guild	Percent of All Birds Documented	Representative Species
Blackbirds	70	Red-winged Blackbird (<i>Agelaius phoeniceus</i>), Common Grackle (<i>Quiscalus quiscula</i>), Brown-headed Cowbird (<i>Molothrus ater</i>), European Starling (<i>Sturnus vulgaris</i>), and Boat-tailed Grackle (<i>Quiscalus major</i>)
Waterfowl	22	Snow Goose (<i>Chen caerulescens</i>), American Black Duck (<i>Anas rubripes</i>), Canada Goose (<i>Branta canadensis</i>), and Hooded Merganser (<i>Lophodytes cucullatus</i>)
Gulls	3	Laughing Gull (<i>Leucophaeus atricilla</i>) and Herring Gull (<i>Larus argentatus</i>)
Meadowlark	1	Eastern Meadowlark (<i>Sturnella magna</i>)
Sparrow	1	Savannah Sparrow (<i>Passerculus sandwichensis</i>) and Grasshopper Sparrow (<i>Ammodramus savannarum</i>)
Raptors	1	Turkey Vulture (<i>Cathartes aura</i>), Northern Harrier (<i>Circus cyaneus</i>), American Kestrel (<i>Falco sparverius</i>), Red-tailed Hawk (<i>Buteo jamaicensis</i>), and Bald Eagle (<i>Haliaeetus leucocephalus</i>)
Other Passerines	<1	Horned Lark (<i>Eremophila alpestris</i>), American Robin (<i>Turdus migratorius</i>), and Eastern Bluebird (<i>Sialia sialis</i>)
Corvids	<1	American Crow (<i>Corvus brachyrhynchos</i>), Fish Crow (<i>Corvus ossifragus</i>), and Blue Jay (<i>Cyanocitta cristata</i>)
Wading Birds	<1	Great Egret (<i>Ardea alba</i>), Glossy Ibis (<i>Plegadis falcinellus</i>), and Cattle Egret (<i>Bubulcus ibis</i>)
Swallows and Swifts	<1	Barn Swallow (<i>Hirundo rustica</i>) and Tree Swallow (<i>Tachycineta bicolor</i>)
Shorebirds	<1	Willet (<i>Tringa semipalmata</i>), Killdeer (<i>Charadrius vociferous</i>), and Black-bellied Plover (<i>Pluvialis squatarola</i>)
Columbids	<1	Mourning Dove (<i>Zenaida macroura</i>) and Rock Pigeon (<i>Columba livia</i>)
Terns	<1	Common Tern (<i>Sterna hirundo</i>)
Other Non-passerines	<1	Double-crested Cormorant (<i>Phalacrocorax auritus</i>) and Belted Kingfisher (<i>Megasceryle alcyon</i>)
Gallinaceous Birds	<1	Wild Turkey (<i>Meleagris gallopavo</i>) and Northern Bobwhite (<i>Colinus virginianus</i>)

Source: USDA APHIS WS 2012

Table 3-32 Most Abundant Bird Species along Breeding Bird Survey Route 88916

Common Name	Scientific Name	Average Number Observed Per Survey
Laughing Gull	<i>Larus atricilla</i>	296.81
Common Grackle	<i>Quiscalus quiscula</i>	84.50
American Crow	<i>Corvus brachyrhynchos</i>	59.94
European Starling	<i>Sturnus vulgaris</i>	51.31
Glossy Ibis	<i>Plegadis falcinellus</i>	42.63
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	38.06
Boat-tailed Grackle	<i>Quiscalus major</i>	26.56
Northern Cardinal	<i>Cardinalis cardinalis</i>	24.56
Indigo Bunting	<i>Passerina cyanea</i>	24.44
Purple Martin	<i>Progne subis</i>	23.94

Source: Sauer et al. 2011

The Christmas Bird Count, like the Breeding Bird Survey, is a long-term avian monitoring program that also relies on volunteer citizen scientists to conduct the surveys (National Audubon Society 2013). The Christmas Bird Count is administered by the National Audubon Society (National Audubon Society 2013). It is an early-winter bird census designed to show trends in avian abundance. The count occurs once every year, with every bird observed and heard within 15-mile-diameter count circles recorded during a 24-hour period (National Audubon Society 2013). The data in Table 3-33 show the 10 most abundant species per year (total numbers seen during the survey) on Christmas Bird Count route VACI, located near WFF, with data from the last 10 years (2002 to 2011) (National Audubon Society n.d.).

The online mapping tool eBird is an internet-based repository of non-reviewed, anecdotal bird observation data from a variety of public contributors (eBird 2012). The data points located near WFF provide information on the number of bird species and their locations near WFF (see Table 3-34).

The state-owned marshes to the south of the Highway 175 Causeway that crosses Shelly Bay leading to Chincoteague contain the largest heron rookery in the area (Watts 2012). The heron rookery is used primarily by the snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), and cattle egret (*Bubulcus ibis*) and typically contains approximately 3,000 birds (Watts 2012).

Table 3-33 Ten Most Abundant Bird Species per Year within Christmas Bird Count Circle VACI (2002-2011)

Common Name	Scientific Name	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
Survey Hours (Number of surveyors x survey time)		119.00	19.00	78.00	95.75	63.50	78.00	86.75	92.00	108.00	84.70
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	67,205	1,454	5,268	8,390	8,730	2,059	6,815	2,759	18,986	1,737
Common Grackle	<i>Quiscalus quiscula</i>	50,895	633	*	7,796	*	2,827	*	*	*	3,164
Snow Goose	<i>Chen caerulescens</i>	9,532	13,455	8,701	8,260	20,942	9,232	7,630	6,335	23,029	2,679
Mallard	<i>Anas platyrhynchos</i>	7,073	860	*	*	*	*	832	*	*	*
Canada Goose	<i>Branta canadensis</i>	4,102	3,321	1,508	*	2,861	1,678	1,182	2,482	2,857	1,431
American Green-winged Teal	<i>Anas crecca</i>	3,987	*	*	*	*	*	*	*	*	*
Dunlin	<i>Calidris alpina</i>	2,135	*	863	*	4,298	941	*	*	2,422	*
American Black Duck	<i>Anas rubripes</i>	2,079	787	1,695	1,556	1,021	2,007	1,305	2,053	2,404	1,168
American Robin	<i>Turdus migratorius</i>	1,608	269	*	*	1,399	*	1,885	1,422	2,417	*
Rock Pigeon	<i>Columba livia</i>	1,585	*	*	*	*	*	*	*	*	*
Bufflehead	<i>Bucephala albeola</i>	*	2,304	*	1,644	857	1,740	*	4,449	*	1,088
European Starling	<i>Sturnus vulgaris</i>	*	467	1,418	2,498	1,080	*	*	1,579	5,309	2,624
Northern Pintail	<i>Anas acuta</i>	*	450	935	1,337	*	*	1,562	*	3,555	*
Yellow-rumped Warbler	<i>Dendroica coronata</i>	*	2,106	*	3,224	2,784	2,422	2,095	2,192	1,747	1,716
Ring-billed Gull	<i>Larus delawarensis</i>	*	1,986	*	*	*	6,815	1,221	1,954	*	*
American Wigeon	<i>Anas americana</i>	*	*	1,230	*	*	*	*	*	*	*
Herring Gull	<i>Larus argentatus</i>	*	*	*	8,183	*	*	1,354	*	*	*
Surf Scoter	<i>Melanitta perspicillata</i>	*	*	*	2,115	*	*	*	*	*	*
White-throated Sparrow	<i>Zonotrichia albicollis</i>	*	*	*	*	904	*	*	*	*	*
Eastern Meadowlark	<i>Sturnella magna</i>	*	*	*	*	*	1,120	*	*	*	*
Brant	<i>Branta bernicla</i>	*	*	*	*	*	*	*	*	2,549	1,730
Gull (unknown <i>Larus</i> species)	<i>Larus</i> sp.	*	*	*	*	*	*	*	3,938	*	*
Blackbird (unknown species)	unknown	*	*	*	*	*	*	*	*	*	5,158

Source: National Audubon Society n.d.

*Species with an asterisk in a given year may have been documented in that year, but the number of individuals observed was not among the ten highest.

Table 3-34 Select Observation Data from eBird Online Mapping Tool

Common Name	Scientific Name	Number	Month/Year	Approximate Location
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	64,001	12/2011	Wallops NWR
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	10,000	12/2010	Hwy 175 next to Shelly Bay
Snow Goose	<i>Chen caerulescens</i>	532	12/2011	Wallops NWR
Snow Goose	<i>Chen caerulescens</i>	227	12/2009	Wallops NWR
American Black Duck	<i>Anas rubripes</i>	15	11/2012	Mosquito Creek Bridge on Hwy 175
American Black Duck	<i>Anas rubripes</i>	12	01/2012	Mosquito Creek Bridge on Hwy 175
American Black Duck	<i>Anas rubripes</i>	44	12/2011	Wallops NWR
American Black Duck	<i>Anas rubripes</i>	24	12/2009	Wallops NWR
Laughing Gull	<i>Leucophaeus atricilla</i>	1,500	07/2012	Queen Anne's Landing
Laughing Gull	<i>Leucophaeus atricilla</i>	120	05/2012	Marine Science Consortium
Laughing Gull	<i>Leucophaeus atricilla</i>	575	05/2011	Mosquito Creek Bridge on Hwy 175
Laughing Gull	<i>Leucophaeus atricilla</i>	1,300	05/2011	Queen Anne's Landing
Laughing Gull	<i>Leucophaeus atricilla</i>	200	4/2010	Mosquito Creek at Trails End

Key:

NWR = National Wildlife Refuge

A review of Tables 3-31, 3-32, 3-33, and 3-34, as well as information gathered from Wildlife Services and USFWS during a meeting held on November 20, 2012, indicates that blackbirds, waterfowl, and gulls are the three most numerous bird groups observed at and in the area surrounding WFF Main Base (U.S. Department of the Navy 2012). During the winter months, individuals belonging to these species groups may form large flocks and use the natural areas in the vicinity of WFF for a night-time roost, dispersing during the day to forage in the surrounding agricultural fields and returning in the evening to rest. These dispersal flights may include flights across WFF airfield, which typically occur during the 1.5 hours after sunrise and the 1.5 hours prior to sunset (U.S.

Department of the Navy 2012). During the spring and summer months, these daily migrations are less common and typically would not include large numbers of flocking birds. Each group is discussed in greater detail below.

Blackbirds are the group that was most often observed in the area of WFF Main Base (Table 3-31). The term “blackbird” describes groups of birds that include blackbirds, grackles, starlings, and cowbirds. During the breeding season (spring and summer), these groups tend to stay in species pairs, but during the winter, these groups may form large mixed flocks. Christmas Bird Count and eBird data (Tables 3-33 and 3-34) indicate large numbers of blackbirds in the vicinity of WFF during winter. On the eastern shore of Virginia, these mixed flocks primarily include four species, the red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), and brown-headed cowbird (*Molothrus ater*). Like the gulls and waterfowl, blackbird flocks take daily migrations to forage in the surrounding agricultural fields. These flocks may contain a very large number of birds, as indicated by the two eBird observations in 2010 and 2011, respectively, of 10,000 and 64,001 individual red-winged blackbirds. These were likely mixed blackbird flocks, although not indicated as such by the data (Table 3-34).

Waterfowl are the second group most observed in the area of the airfield at WFF Main Base (Table 3-31). Waterfowl presence at WFF includes primarily fly-over birds because most habitats are located off the facility. Although there are waterfowl in the vicinity of WFF year-round, the peak period for waterfowl activity as indicated by the Christmas Bird Count and eBird data (Tables 3-33 and 3-34) is in winter, when snow geese (*Chen caerulescens*), American black ducks (*Anas rubripes*), Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), buffleheads (*Bucephala albeola*), northern pintails (*Anas acuta*), brant (*Branta bernicla*), and other waterfowl species congregate in the marshes located in the vicinity of WFF Main Base. Wintering waterfowl form flocks that take daily migrations to forage in the surrounding agricultural fields, water bodies, and marshes. Snow geese may form very large flocks, which number in the hundreds or thousands at times, for these daily foraging movements.

Gulls are listed as the third group most often observed in the area of WFF Main Base (Table 3-31). During the spring and summer breeding season, as indicated by the Breeding Bird Survey and eBird data, the laughing gull (*Leucophaeus articilla*) is prevalent in the area. Also, the state-owned marshes to the south of the Highway 175 Causeway that crosses Shelly Bay leading to Chincoteague contain the largest gull nesting site in the area (Watts 2012). The gull nesting site typically contains approximately 5,000 nesting laughing gulls, great black-backed gulls (*Larus marinus*), and herring (*Larus argentatus*) gulls (Watts 2012). During the spring and summer, gulls tend to congregate at the nesting locations but forage individually or in small loose groups. Wildlife Services has observed laughing gulls from March through August (U.S. Department of the Navy 2012). While over-wintering, gulls tend to form larger flocks that take daily migrations to forage in the surrounding areas. The gull species that are most common in the area during the winter as indicated by the Christmas Bird Count data are the ring-billed gull (*Larus delawarensis*) and herring gull.

Other Wildlife

Large mammal species documented at WFF include the white-tailed deer and red fox. Small mammals include the gray squirrel, Virginia opossum, raccoon, white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pennsylvanicus*), marsh rice rat, and eastern cottontail. River otters have been observed on the marsh/upland interface. Amphibians include the Fowler's toad and green tree frog (*Hyla cinerea*). Reptiles include the eastern rat snake (*Pantherophis alleghaniensis*), black racer (*Coluber constrictor constrictor*), hognose snake (*Heterodon platyrhinos*), snapping turtle (*Chelydra serpentina*), eastern box turtle (*Terrapene carolina carolina*), northern fence lizard (*Sceloporus undulatus*), five-lined skink (*Eumeces fasciatus*), and diamondback terrapin (*Malaclemys terrapin*) (NASA 2008a, 2011a).

A 1996 amendment to the Magnuson-Stevens Fishery Conservation and Management Act of 1976 instituted a new mandate to identify and provide protection to important marine and anadromous fisheries habitat, or essential fish habitat. The waters adjacent to WFF Main Base do have essential fish habitat present. However, no in-water activities are associated with the Navy's proposed action that would impact essential fish habitat; therefore, it is not included in this analysis. Fish species documented in Chincoteague Bay are most commonly estuarine-dependent species. These include game species such as summer flounder (*Paralichthys dentatus*), Atlantic croaker (*Micropogonia undulates*), striped bass (*Morone saxatilis*), black sea bass (*Centropristis striata*), weakfish (*Cynoscion regalis*), and spot (*Leiostomus xanthurus*). The bay is also habitat for forage fish species such as bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*), and Atlantic silverside (*Menidia menidia*) (Maryland DNR 2005).

3.11.3.3 Protected Species

The USFWS and NMFS share federal jurisdiction for federally threatened and endangered sea turtles, with USFWS having lead responsibility on the nesting beaches and NMFS having lead responsibility on the marine environment. The VDGIF's Wildlife Environmental Review Map Service and the USFWS's Information, Planning, and Conservation System databases were searched to identify federally threatened and endangered species under USFWS jurisdiction potentially occurring within or in the vicinity of WFF Main Base (VDGIF 2012, USFWS 2012c). The original action area searched in the databases outlined the modeled 65 dB DNL and greater noise zone. No federally threatened and endangered species under USFWS jurisdiction were identified. In response to public and agency comments on the Draft EA, the action area was expanded to include the FCLP and holding pattern and the 65 dB DNL and greater noise zone. Species identified as potentially occurring in the action area, using the expanded search criteria, are presented in Table 3-35 and described in the following.

Table 3-35 Federally Threatened and Endangered Species Potentially Occurring at or in the Vicinity of the Wallops Flight Facility Main Base

Common Name	Scientific Name	Federal ESA Status
Birds		
Piping Plover	<i>Charadrius melodus</i>	Threatened
Red Knot	<i>Calidris canutus rufa</i>	Candidate
Plants		
Seabeach Amaranth	<i>Amaranthus pumilus</i>	Threatened
Sea Turtles		
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	Endangered
Green Sea Turtle	<i>Chelonia mydas</i>	Threatened
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	Endangered
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Endangered
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Threatened
Marine Fish		
Atlantic Sturgeon (Chesapeake Bay Distinct Population Segment)	<i>Acipenser oxyrinchus oxyrinchus</i>	Endangered
Shortnose Sturgeon	<i>Acipensar brevirostrum</i>	Endangered
Blueback Herring	<i>Alosa aestivalis</i> and <i>Alosa pseudoharengus</i>	Candidate
Scalloped Hammerhead Shark	<i>Sphyrna lewini</i>	Candidate

Source: NMFS 2012b

Piping Plover

The piping plover (*Charadrius melodus*), a small migratory shorebird, is listed as a threatened species both federally and by Virginia (VDGIF FWIS 2012c). Piping plovers build nests above the high tide line on coastal beaches, sandflats at the ends of sandspits and barrier islands, gently sloping foredunes, and in blowout and washover areas in dunes. They may also nest in areas where suitable dredge material has been deposited (USFWS 1996). In Virginia, nesting typically occurs between April 7 and June 21, although re-nesting attempts may occur past July 1 (VDGIF FWIS 2012d). Piping plovers do not occur on WFF Main Base; however, they use beaches on barrier islands close to WFF, including Assawoman, Metompkin, Cedar, Wallops, and Assateague Islands, for courtship, nesting, and raising chicks (NASA 2010a).

Red Knot

The red knot (*Calidris canutus rufa*), a large sandpiper, is a federal candidate species. Red knots breed on the arctic tundra (Harrington 2001). They winter on tidal and intertidal flats, marshes, and sandy or muddy beaches and shorelines, and forage in these areas during migration (VDGIF FWIS 2012e). Red knots do not occur on WFF Main Base; however, the Virginia barrier islands provide an important stopover area for large numbers of red knots during their northern migration (NASA 2010a).

Seabeach Amaranth

Seabeach amaranth (*Amaranthus pumilus*), an annual plant, is listed as a threatened species both federally and by Virginia (VDGIF FWIS 2012c). It grows on barrier island beaches, primarily on overwash flats at accreting ends of islands, lower foredunes, and upper strands of non-eroding beaches (USFWS n.d. [c]). Although the species has not been documented, potentially suitable habitat for seabeach amaranth occurs on Wallops Island (NASA 2010a). No suitable habitat for this species occurs on WFF Main Base.

Sea Turtles and Marine Fish

The hawksbill (*Eretmochelys imbricate*), Kemp's ridley (*Lepidochelys kempii*), and leatherback (*Dermochelys coriacea*) sea turtles are listed as endangered species both federally and by Virginia, while the green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) sea turtles are listed as threatened species both federally and by Virginia (NMFS 2012a, VDGIF FWIS 2012c). Of these species, all but the hawksbill sea turtle are known to migrate along East Coast beaches and occur in the region from approximately April through November (NASA 2010a). Occurrences of hawksbill sea turtles north of Florida are rare, but sightings have been reported as far north as Massachusetts (NMFS 2011, 1993). Of the five sea turtle species likely to occur, only the loggerhead sea turtle is known to have nested on beaches in the region, and nests have been documented on Wallops Island beaches (NASA 2010a). No critical habitat has been designated for the loggerhead sea turtle. Critical habitat has been designated for the remaining sea turtle species; however, none occurs in the vicinity of the proposed action. Within Chincoteague Bay, individual sea turtles are likely to only forage and rest in the shallow estuarine waters. Nesting as far north as Virginia and nesting in small isolated bays are both very rare for sea turtles. No suitable habitat for this species occurs on WFF Main Base.

Additional literature searches indicated that federally threatened and endangered species under NMFS jurisdiction could occur in Chincoteague Bay, located under a portion of the action area, to the northeast of WFF Main Base between the mainland and Chincoteague Island. Species include the hawksbill (*Eretmochelys imbricate*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*) sea turtles as well as two federally endangered fish species, the shortnose sturgeon (*Acipenser brevirostrum*) and the Chesapeake Bay Distinct Population Segment of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (NMFS 2012b). The shortnose sturgeon is also state listed as an endangered species. Neither sturgeon species has designated critical habitat. Both the shortnose and Atlantic sturgeon are anadromous fish that spawn in the freshwater of major rivers along the Atlantic Coast and spend their juvenile and adult life stages in coastal and estuarine waters (NMFS 2012c; NMFS 2012d). While there are no major freshwater rivers within the region of the action area, the possible presence of both the shortnose and Atlantic sturgeon could be due to their affinity for estuarine waters such as those around the action area and in Chincoteague Bay. Other fish species, including the blueback herring (*Alosa aestivalis*) and scalloped hammerhead shark (*Sphyrna lewini*), both listed as federal candidate

species, could be found within the action area (NMFS 2012b). Candidate species are not required to have designated critical habitat.

State Protected Species

A list of additional state-listed threatened and endangered species potentially occurring within or in the vicinity of WFF Main Base was developed through a search of VDGIF's Wildlife Environmental Review Map Service database and written correspondence to the VDCR, Division of Natural Heritage (Baird 2012, VDGIF 2012). The database search outlined the modeled 65 dB DNL noise contour. The search indicated potential occurrences of two additional state-listed species within the area encompassing the modeled 65 dB DNL noise contour around WFF Main Base: the bald eagle and gull-billed tern (*Gelochelidon nilotica*).

Bald Eagle

The bald eagle is a state-listed threatened species in Virginia. It is also federally protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (USFWS 2011b). Five bald eagle nests occur within approximately 5 miles of WFF Main Base; all five were listed as active/occupied in 2011 (Figure 3-24) (Watts and Byrd 2011b). The closest bald eagle nest is adjacent to the eastern side of WFF Main Base, across Chincoteague Road (Route 175) and inside of the Wallops Island National Wildlife Refuge, while the second-closest nest is approximately 0.2 mile north of WFF Main Base. Prior to establishing the nest to the north of WFF Main Base, the eagle pair had another nest closer to Runway 10, within the WFF Main Base property boundary from 1993 to 1994, before they moved up Mosquito Creek in 1995. They relocated to their current position in 1997 and have a history of productivity, including two chicks in 2011 (Watts 2012). The remaining nests are more than 2 miles from WFF Main Base.

Gull-billed Tern

The gull-billed tern, a medium-sized tern, is listed as a threatened species by Virginia (VDGIF FWIS 2012c). It nests on sandy beaches in the spring and summer, and winters in salt marshes, estuaries, and lagoons. The gull-billed tern is not known to occur on WFF Main Base; however, it has been documented nesting on the beaches and mud flats on Wallops Island, approximately 7,500 feet from the end of Runway 22 (NASA 2010a).

3.11.4 Impacts on Biological Resources at Wallops Flight Facility

3.11.4.1 Vegetation

Under Alternative 2, a maximum of 0.05 acre of maintained grassland would be permanently removed to construct the concrete pads. Temporary impacts on maintained grassland would also result from the installation of buried utility lines. Following installation of the utility lines, the area would be restored to its original condition through grading and replanting of vegetation. Overall, implementation of Alternative 2 would have no significant impact on vegetation. Additionally, implementation of Alternative 2 would have no significant impact on the Division of Natural Heritage conservation sites because no construction would occur in those sites, and the Navy will adhere to applicable state and local erosion and

sediment control/stormwater management laws and regulations (see Section 3.10.4.4).

3.11.4.2 Marine Mammals, Birds, and Other Wildlife

Marine Mammals

Construction Impacts. As no construction activities would take place in Chincoteague Bay or impact the bay in any way, there would be no significant impacts to marine mammals from construction activities under Alternative 2.

Noise Impacts. Transmission of noise from aircraft into the water would be possible; however, animals would have to be at or near the surface at the time of an overflight to be exposed to elevated sound levels. Smaller delphinids, including the bottlenose dolphin, generally react to aircraft overflights either neutrally or with a startle response (Wursig et al. 1998). It has also been reported that dolphins generally show no reaction to the overflight of survey aircraft unless the aircraft's shadow passes directly over them (Richardson et al. 1995).

Considering that the change in the area within the existing 65 dB DNL and greater noise zone and the proposed 65 dB DNL and greater noise zone is so small (see Figures 3-14 and 3-15), it would be unlikely that a bottlenose dolphin would be in the impact area during Navy overflights. Any chance exposure of a dolphin to aircraft and the accompanying change in noise would last for only seconds as the aircraft quickly passes overhead. Also, considering the existing rocket launches from Wallops Island (located approximately 6 miles from the southern boundary of WFF Main Base) and the fact that the Navy's proposed action under Alternative 2 would be temporary and intermittent in nature, the increase in aircraft operations at WFF Main Base associated with Alternative 2 would not be expected to have a discernible impact on the bottlenose dolphin. Therefore, Alternative 2 would not result in Level A or Level B harassment as defined under the Marine Mammal Protection Act, and there would be no significant impact to the bottlenose dolphin.

Birds and Other Wildlife

Construction Impacts. Under Alternative 2, construction of concrete pads and installation of underground utility lines would occur primarily in areas containing maintained grassland, although some of the underground utility lines may be horizontally drilled under existing paved areas. The maintained grassland habitat is unlikely to support many species of wildlife/birds. However, construction of concrete pads and installation of utility lines could result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Construction of concrete pads would permanently remove a maximum of 0.05 acre of maintained grassland. Following installation of the utility lines, the area would be restored to its original condition, resulting in minor and temporary impacts on wildlife/bird habitat. Temporary displacement of wildlife/birds could occur in peripheral areas during construction, when noise and human activity

levels would increase. However, once construction has been completed, wildlife/birds should return. In addition, as no construction activities would take place in Chincoteague Bay or impact the bay in any way, there would be no impacts to marine fish from construction activities under Alternative 2. Overall, implementation of Alternative 2 would have no significant impact on wildlife from temporary construction.

Noise Impacts. Studies of general noise impacts on wildlife are summarized in Section 3.11.4.2. It is expected that most wildlife/birds present at or in the vicinity of the airfield would likely be acclimated to aircraft noise due to current aircraft operations at WFF Main Base; however, the minor increase in the extent of the noise zones greater than 65 dB DNL under Alternative 2 compared to the baseline has the potential to increase noise exposure on wildlife not currently acclimated to these noise levels. It is important to note that the Navy's proposed action under Alternative 2 would be temporary and intermittent in nature. Additionally, the existing conditions at WFF Main Base include several other sources of man-made noise (e.g., rocket launches from Wallops Island [located approximately 6 miles from the southern boundary of WFF Main Base] and aircraft operations from WFF Main Base). Based on noise studies (Grubb and King 1991; Ellis et al. 1991; Black et al. 1984; Conomy et al. 1998), some species may endure longer-term effects, due to repeated physiological responses, but most species would be expected to acclimate or habituate to noise exposure after short-term effects. Therefore, noise associated with aircraft operations under Alternative 2 would have no significant impact on wildlife/birds for the duration of the Navy's proposed action.

Under Alternative 2, individual aircraft would fly over a small segment of the Wallops Island National Wildlife Refuge at approximately 600 feet above ground level (see Figure 3-24). The Navy's proposed action under Alternative 2 would be temporary and intermittent in nature. Additionally, other sources of man-made noise occur at WFF (e.g., rocket launches from Wallops Island, located approximately 6 miles from the southern boundary of WFF Main Base). Given the current air operations at WFF Main Base and the likelihood that birds and wildlife at the refuge are already habituated to aircraft noise, no significant impacts on the refuge would be expected from an increase in air operations at WFF Main Base.

Under Alternative 2, aircraft would fly over a small portion of the Barrier Island/Lagoon System Important Bird Area at approximately 600 feet above ground level (see Figure 3-24). The Navy's proposed action under Alternative 2 would be temporary and intermittent in nature. Additionally, other sources of human-made noise occur at WFF (e.g., rocket launches from Wallops Island, located approximately 6 miles from the southern boundary of WFF Main Base). Given the current air operations at WFF Main Base (13,074 annually) and the likelihood that birds and other wildlife near the facility are already habituated to aircraft noise, no significant impacts on the Important Bird Area would be expected from an increase in air operations.

Any marine fish that occur regularly in Chincoteague Bay are already habituated to noise from current and ongoing aircraft overflights, and the projected noise contours under Alternative 2 are only slightly larger than the existing noise contours at WFF Main Base. Therefore, there would be no significant impact to fish species present in Chincoteague Bay from the increase in aircraft operations at WFF Main Base associated with Alternative 2.

Strike Impacts. An increase in air operations at WFF due to the Navy's proposed action could result in a minor increase in the potential of an in-air bird strike. To minimize this risk, the Navy has realigned the holding pattern away from the Barrier Island/Lagoon System Important Bird Area and elevated the altitude of the holding pattern to at or above 3,500 feet, since 93 percent of all strikes were found to occur below that altitude (Dolbeer 2006). WFF Main Base has an existing, robust BASH management program, which will be adhered to and expanded upon, as needed, and all flight operation standard operating procedures would be followed. For information on how bird and animal hazards will be managed if the Navy's proposed action were implemented at WFF, refer to Section 3.3.5.2. Given these considerations, there would be no significant impact to birds in flight from the proposed action.

Based on the foregoing, the Navy has also determined that proposed flight training operations would not result in a significant adverse impact to populations of migratory birds under the Migratory Bird Treaty Act, and the proposed action would not be expected to result in a take or significant impact to bald eagles (see Section 3.11.4.3 for additional discussion of these and other protected species).

3.11.4.3 Protected Species

In response to public and agency comments on the Draft EA, the action area for evaluation of potential impacts to federally threatened and endangered species was expanded to include the FCLP and holding pattern and the 65 dB DNL and greater noise zone. The following federally listed species were evaluated for their potential presence at or in the vicinity of WFF Main Base.

Piping Plover

Piping plovers do not occur on WFF Main Base and therefore would not be impacted by construction under Alternative 2. Additionally, no significant increase in aircraft noise would be expected on the barrier islands where piping plovers are likely to occur. Consequently, Alternative 2 would have no effect on the federally threatened piping plover.

Red Knot

The red knot does not occur on WFF Main Base and therefore would not be impacted by construction under Alternative 2. Additionally, no significant increase in aircraft noise would be expected on the barrier islands where red knots are likely to occur during spring migrations. Consequently, Alternative 2 would have no effect on the federal candidate species red knot.

Seabeach Amaranth

No suitable habitat for the seabeach amaranth occurs on WFF Main Base, where construction could potentially impact the species. No impacts would be expected from aircraft overflights or the noise generated by them. Therefore, Alternative 2 would have no effect on this federally threatened species.

Sea Turtles and Marine Fish

As no construction activities associated with Alternative 2 would occur in Chincoteague Bay or indirectly impact the bay, there would be no effect on loggerhead, Kemp's ridley, and green sea turtles and the Atlantic and shortnose sturgeon, blueback herring, or scalloped hammerhead shark from construction under Alternative 2.

There is also no suitable nesting habitat for sea turtles at WFF Main Base or in the action area, so there would be no impacts to nesting turtles. Considering the existing aircraft overflights and rocket launches from Wallops Island (located approximately 6 miles from the southern boundary of WFF Main Base), the increase in aircraft operations at WFF Main Base associated with Alternative 2 would not be expected to have a discernible impact on sea turtles or fish. Therefore, there would be no effect on the federally threatened loggerhead and green sea turtles, the federally endangered hawksbill, Kemp's ridley and leatherback sea turtles, or to the federally endangered Atlantic and shortnose sturgeons. Similarly, the proposed action under Alternative 2 would not jeopardize the federal candidate blueback herring or scalloped hammerhead shark.

Bald Eagle

Although ESA protections have been lifted, federal protections remain under separate U.S. codes, including the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Given the current air operations at WFF Main Base, bald eagles nesting close to the facility are likely habituated to aircraft activity and noise. Three of the five nests are more than two miles from WFF and would likely not be impacted by the proposed increase in air operations. The two closest nesting pairs of bald eagles are likely habituated to noise disturbance at WFF, judging by their proximity to the airfield, continual exposure to existing low-level flight operations, and by the longevity and productivity of their nests. Therefore, an increase in air operations at WFF Main Base under Alternative 2 would not be expected to result in a take of bald eagles or any significant impact on the species. Because there would be no takes or direct, indirect, or cumulative impacts to bald eagles under Alternative 2, a non-purposeful take permit (50 CFR 22.26) under the Bald and Golden Eagle Protection Act would not be required. Likewise, a take permit (50 CFR 21.11) would not be required under the Migratory Bird Treaty Act because no significant adverse impact would occur.

Gull-billed Tern

Gull-billed terns do not occur on WFF Main Base and therefore would not be impacted by construction under Alternative 2. Additionally, no significant increase in aircraft noise would be expected on the barrier islands where gull-billed terns are likely to occur. Consequently, Alternative 2 would have no effect and therefore no significant impact on the state-threatened gull-billed tern.

3.12 Cultural Resources

Section 106 of the NHPA of 1966, as amended, and its implementing regulations (36 CFR Part 800) require that federal agencies consider the effects of their undertakings on historic properties. Cultural resources may include archaeological resources (prehistoric and historic archaeological sites) and architectural resources (historic buildings and structures). Historic properties are those cultural resources that have been included in, or determined eligible for inclusion in, the National Register of Historic Places.

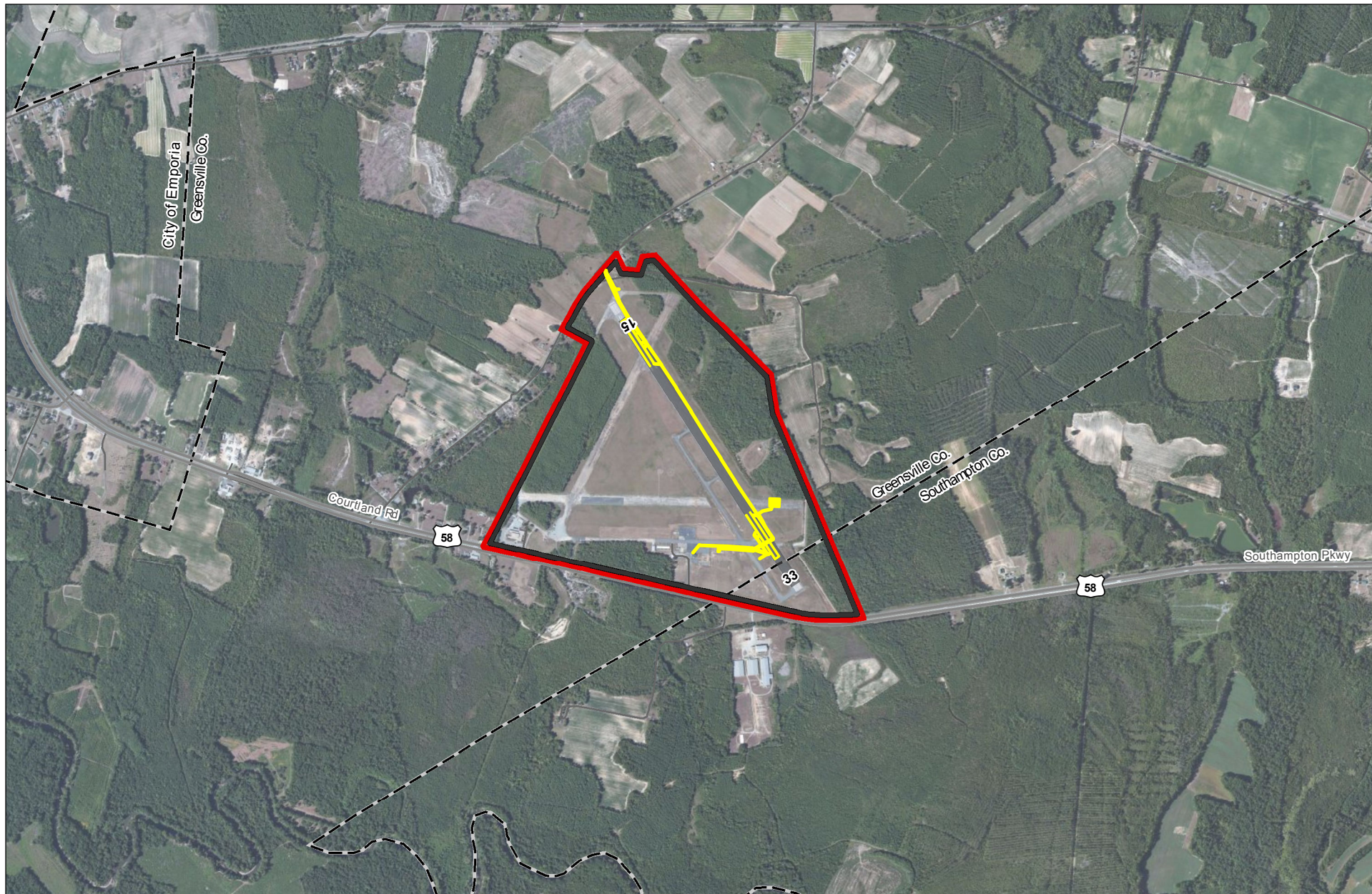
3.12.1 Cultural Resources at Emporia-Greenville Regional Airport

The study area for this cultural resources analysis is shown in Figure 3-25. The Virginia State Historic Preservation Office (SHPO) concurred with the defined area of potential effects (see Appendix A, Agency Consultation).

Previous cultural resources surveys, prior and unrelated to the Navy's action, have been conducted at Emporia-Greenville. This includes a 2011 study for a potential FAA action to shift Runway 33 to the north (Browning and Chaffman 2011), which indicated that there were both prehistoric and historic settlement and/or use of the area. Other cultural resources surveys conducted in the vicinity of the airport, prior and unrelated to the Navy's action, were conducted by vocational and professional researchers and focused on the margins of the Meherrin River, located approximately 1 mile southwest of the Emporia-Greenville property. While researchers have identified prehistoric archaeological sites and a Native American site in the vicinity of the property, all were located more than 1 mile from the airport property and not within the defined area of potential effects for this project (Browning and Chaffman 2011).

No previously identified National Register of Historic Places-listed or -eligible architectural resources, or architectural resources listed in the Virginia Landmarks Register, have been identified at Emporia-Greenville (NPS 2012a, 2012b; NRHP 2012; Virginia DHR 2011a, 2011b).

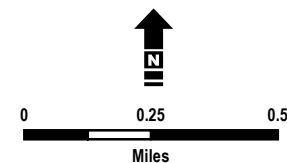
A July 2011 site visit by Navy cultural resources staff determined that the proposed action's construction areas, primarily located along Runway 15/33, show evidence of grading, filling, and other subsurface disturbance that likely occurred during clearing and construction of the runway beginning in the 1940s and during maintenance of the airfield since that time, as evidenced from the presence of existing paved areas, underground utilities, and lights (Lewis 2011). This supports the determination that the locations of the minor airfield modifications under the Navy's proposed action at Emporia-Greenville will not result in any new or direct impacts on archaeological resources.



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

- Active Runway
- Emporia-Greenville Regional Airport
- County Boundary
- Area of Potential Effects
- Improvement_electrical_phone
- Major Highway
- Local Street

Figure 3-25
Area of Potential Effects
 Emporia-Greenville Regional Airport



Based on a review of existing cultural resources surveys, no architectural resources at Emporia-Greenville are either individually eligible for inclusion in the National Register of Historic Places or constitute an eligible historic district (Lewis 2011; Holma 2012a); therefore, the proposed action will have no effect on listed or eligible properties.

The Navy consulted with the Virginia SHPO on December 5, 2011, regarding the proposed action. Information submitted to the Virginia SHPO by the Navy included an archaeological assessment of the proposed construction areas within the Emporia-Greenville area of potential effects and an evaluation of the existing buildings and structures within the Emporia-Greenville area of potential effects (Lewis 2011).



The Virginia SHPO responded to this consultation on January 5, 2012, concurring with the Navy's determination that the proposed action at Emporia-Greenville would have no effect on National Register of Historic Places or eligible properties pursuant to 36 CFR Part 800 (Holma 2012a).



The Navy inquired with local governments regarding local cultural resources and determined that consultation with federally recognized tribes, the Virginia Council on Indians, and the Advisory Council on Historic Preservation does not need to be conducted because cultural resources related to the proposed action would not likely be impacted. Refer to Appendix A, Agency Consultation for more details and the full Section 106 consultation package for Emporia-Greenville.

3.12.2 Existing Cultural Resources at Wallops Flight Facility

The study area for this cultural resources analysis is the area of potential effects for the proposed action at WFF Main Base, which was defined by the Navy as the boundary of the WFF Main Base property. The area of potential effects for WFF Main Base is also shown in Figure 3-26. The Virginia SHPO has concurred with this area of potential effects (see Appendix A, Agency Consultation).

NASA conducted two archaeological assessments of the WFF property, in 2003 and in 2006, to determine the presence of archaeological resources and archaeological sensitivity. Four historic archaeological sites have been identified at WFF Main Base (see Table 3-36), and a number of areas of prehistoric and historic archaeological sensitivity have been identified within the area of potential effects at WFF Main Base (URS Corporation, Inc., and EG&G Technical Services, Inc., 2003; URS Corporation, Inc., 2006). None of these sites or archaeologically sensitive areas are located within areas proposed for modification as part of the proposed action.

 Active Runway
  Proposed Construction Locations

 Wallops Flight Facility
  Major Highway



 Area of Potential Effects
  Local Street

Table 3-36 Known Archaeological Resources within the Wallops Flight Facility Main Base

Site Number	Description	NRHP-Eligibility Status
44AC103	Late 18 th century domestic (historic) archaeological site and associated grave/cemetery associated with the location of the ca. 1788 Matthews House	Previously recommended not eligible
44AC405	Historic archaeological site (19 th century artifact scatter)	Previously recommended not eligible
44AC437	Historic archaeological site (18 th and 19 th century artifact scatter)	Previously recommended not eligible
44AC556	Multi-component archaeological site (Late Woodland prehistoric artifact scatter and 19 th century single grave)	Under evaluation

Source: URS Corporation, Inc., and EG&G Technical Services, Inc., 2003; URS Corporation, Inc., 2006.

Key:

NRHP = National Register of Historic Places

No previously identified National Register of Historic Places-listed or -eligible architectural resources, or architectural resources listed in the Virginia Landmarks Register, have been identified at WFF Main Base (NPS 2012b, NRHP 2012; Virginia DHR 2011b). A historic resources eligibility survey of the WFF Main Base property was conducted by NASA in 2011 to determine the National Register of Historic Places-eligibility of buildings 50 years old or older. Based on the results of this survey, none of the architectural or built resources at the WFF Main Base were recommended or determined National Register of Historic Places-eligible (Thursby and Martin 2011). The Virginia SHPO concurred with the findings of the historic resources survey, indicating that none of the buildings evaluated were individually eligible for the National Register of Historic Places or National Register of Historic Places-eligible as a historic district (Lee 2011).

3.12.3 Impacts on Cultural Resources at Wallops Flight Facility

The Navy determined that the minor airfield modifications under the Navy's proposed action at WFF Main Base would not result in any new direct or indirect impacts on archaeological resources because these areas showed evidence of grading, filling, and other subsurface disturbance that likely occurred during clearing and construction of the runways during World War II, and/or maintenance of the airfield over that past 70-plus years (Lewis 2012). The Navy has determined that surficial changes to Runways 4/22 and 10/28 would be consistent with previous changes made to the runways over the past 70-plus years and would not result in new or different direct impacts on these architectural resources. No direct impacts would occur to any of the remaining architectural resources in the WFF Main Base area of potential effects. The Navy has determined that the introduction of additional aircraft and resulting noise from its proposed FCLP operations would be consistent with current and former uses and settings of the runways in the WFF Main Base area of potential effects and would not result in new or different indirect visual or auditory impacts on the architectural resources in the WFF Main Base area of potential effects.

The Navy consulted with the Virginia SHPO on January 17, 2012, regarding the proposed action pursuant to Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 (see Appendix A, Agency Consultation). As part of this consultation, the Navy determined that the proposed action at WFF Main Base would have no effect on archaeological or architectural resources (Lewis 2012). The Virginia SHPO responded to this consultation on January 17, 2012, concurring with the Navy's determination that the proposed action at WFF Main Base would have no effect on National Register of Historic Places-eligible properties (Holma 2012b); therefore, the proposed action would have no significant impact on cultural resources.

The Navy inquired with local governments regarding local cultural resources and determined that additional consultation with federally recognized tribes, the Virginia Council on Indians, and the Advisory Council on Historic Preservation does not need to be conducted because cultural resources related to the proposed action would not likely be impacted. Refer to Appendix A, Agency Consultation, for more details and the full Section 106 consultation package for WFF Main Base.

3.13 Socioeconomics

This section examines four aspects of socioeconomics: housing values, community services, environmental justice, and protection of children from environmental health risks and safety risks. The proposed action would not result in a change to the size of the local population, and therefore this resource area is not included in this analysis. Furthermore, the economy, employment, and tax revenues are not discussed because they are also not relevant to the proposed action and would not be significantly impacted.

Housing Values

Several studies have been conducted to determine the effect of aircraft noise on property values, and the results were mixed. Some of the studies found a correlation between decreased property values and exposure of homes to airport noise, while other studies found that properties closer to an airport had higher property values. The lack of conclusive data linking proximity to an airport with property value suggests that there are numerous additional factors that influence these values.

Jud and Winkler (2006), Bell (2001), and Helmuth and Raytheon (1997) all found a negative correlation between property values and proximity to either a new airport or airport expansion. Bell (2001) found that property values were lower for homes above the projected 60 dB DNL of the airport than below 60 dB DNL; Jud and Winkler (2006) found that property values within 4 miles of the airport were lower than those in the control area (i.e., the area of comparison).

Fidell (1996) studied the effect of aircraft noise on sale prices of residential properties in the vicinity of two military facilities and found that equations developed for one area to predict residential sale prices in areas unaffected by

noise worked equally well when applied to predicting sale prices of homes in areas with aircraft noise in excess of 65 dB DNL. Therefore, the model worked equally well in predicting sale prices in areas with and without aircraft noise exposure. This indicates that aircraft noise had no meaningful effect on residential property values in some cases.

Fidell found that, similar to other researchers, differences in sale prices between homes with and without aircraft noise exposure were frequently due to factors other than noise itself.

3.13.1 Existing Socioeconomic Conditions at Emporia-Greenville Regional Airport

3.13.1.1 Housing

Existing houses in the vicinity of Emporia-Greenville are primarily located along sections of U.S. Route 58 and James River Junction. These sections of roads are both located within Greenville County, which is the Navy's study area for housing. According to the U.S. Census, the five-year (2006-2010) average median home value for Greenville County is \$94,600 (U.S. Census Bureau, 2006-2010 American Community Survey [a]). There are a minimal number of housing units in the far western portion of Southampton County, where the airfield is located, and the City of Emporia, which is located 1.4 miles to the west (measured from the eastern city limits to the airport entrance). There are no houses in any of the three municipalities that are located within the existing 65 dB DNL or greater noise zone at Emporia-Greenville.

3.13.1.2 Community Services

The study area for the community services analysis is Greenville County and the City of Emporia. Community services include publicly available benefits such as fire and emergency medical response and police protection.

The Emporia Volunteer Fire Department is the first responder to emergency calls from the City of Emporia and most of Greenville County. The department operates out of one fire station in the city and has 35 volunteer firefighters (County of Greenville, Virginia, and K.W. Poore & Associates, Inc. 2008; County of Greenville, Virginia 2012a). Greenville County is also served by the Jarratt Volunteer Fire Department, which operates out of a fire station located in the Town of Jarratt on the border between Greenville County and Sussex County. The Jarratt Volunteer Fire Department has 25 volunteer personnel, of which 10 are trained emergency medical technicians and four are trained cardiac technicians (County of Greenville, Virginia 2012b). In the event of a fire at the airport, either fire department could and most likely would respond (Franklin 2011); however, the Emporia Volunteer Fire Department is located closer to the airport (approximately 3 miles west). When the airport had an incident involving a hard landing, the fire department's response time was approximately 5 minutes (Franklin 2011).

Pre-hospital emergency care for emergency calls within Greenville County is provided by the Greenville Volunteer Rescue Squad, which has 41 volunteer

members and would respond to the airport in an emergency situation. Each member is required to complete emergency medical technician basic training and be certified in emergency vehicle operations; additionally, each member is encouraged to complete advanced life support training. The volunteer rescue squad also provides emergency transport to Southern Virginia Regional Medical Center and Greenville Memorial Hospital, both located in the City of Emporia. Southern Virginia Regional Medical Center serves approximately 19,500 people and has 80 licensed beds (Southern Virginia Regional Medical Center 2012). Greenville Memorial Hospital serves approximately 31,000 people and has 179 licensed beds (County of Greenville 2012c).

The Greenville County Sheriff's Department employs 29 sworn officers. The Uniform Patrol Department of the Sheriff's Department provides first response to all reports and complaints in the county and at Emporia-Greenville Regional Airport. The Sheriff's Department also coordinates with the City of Emporia Police Department and Virginia State Police on joint drug enforcement operations and criminal investigations (County of Greenville, Virginia, and K.W. Poore & Associates, Inc. 2008). The Virginia State Police has a Bureau of Field Operations area office in the City of Emporia (Virginia State Police 2009).

3.13.1.3 Environmental Justice

Environmental justice is achieved if minority and low-income communities are not subjected to disproportionately high or adverse environmental effects. To evaluate the potential impact of the action, each resource area's potential effect on the human population was considered. The DNL noise contours for the Navy's proposed action were deemed most appropriate for identifying the geographic area to evaluate the presence of minority or low-income populations surrounding the airfield. Therefore, the study area for the environmental justice analysis at Emporia-Greenville includes the census block groups within greater than 65 dB DNL noise zone. Although larger than the study area, Greenville County, Southampton County, and the City of Emporia are described in this existing conditions section to provide context demographic data for Virginia.

The race, ethnicity, and poverty status characteristics of the populations in the City of Emporia and Greenville and Southampton counties are examined and compared with state and national data in Table 3-37. Figure 3-27 shows the census tracts and census block groups surrounding Emporia-Greenville.

The population defined as minority in the City of Emporia and Greenville County comprises over 60 percent of the total population. The number of minority residents in Southampton County is also higher than the state-wide and nation-wide averages. In each of these municipalities, African Americans represent the largest racial group, composing 62.2 percent of the population in the City of Emporia, 59.6 percent of the population in Greenville County, and 37.1 percent of the population in Southampton County. The percentage of the population in the municipalities that is of Hispanic or Latino origin is less than the percentage in Virginia, at 7.9 percent (U.S. Census Bureau, 2010 Census). Each of these municipalities has a greater percentage of individuals below the poverty level than the rest of Virginia.

Table 3-37 Demographic Data Related to Minority, Hispanic, and Low-Income Populations, City of Emporia, Greenville County, and Southampton County, 2010

Location	Total Population	Minority (Not Hispanic or Latino) ¹		Hispanic or Latino ²		Total Minority		Total below Poverty Level	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Virginia	8,001,024	2,182,749	27.4	631,825	7.9	2,814,574	35.2	888,114	11.1
City of Emporia	5,927	3,817	64.4	262	4.4	4,079	68.8	1,541	26.0
Greenville County	12,243	7,442	60.8	173	1.4	7,615	62.2	2,057	16.8
Southampton County	18,570	7,229	38.9	203	1.1	7,432	40.0	2,934	15.8

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

Notes:

¹ Minority populations include individuals who identify themselves as American Indian or Alaskan Native; Asian or Pacific Islander; African American, not of Hispanic origin; or Hispanic. In order to not double-count individuals, those who according to the U.S. Census were both minority and Hispanic or Latino were only included under Hispanic or Latino.

² Percentages of minorities and Hispanic/Latino may not add up exactly to the total percentages of minorities due to rounding.

The noise contours associated with existing aircraft operations at Emporia-Greenville are located entirely within airport property. Therefore, there are no existing disproportionately high and adverse environmental effects on minority and low-income communities in the surrounding municipalities or census block groups.

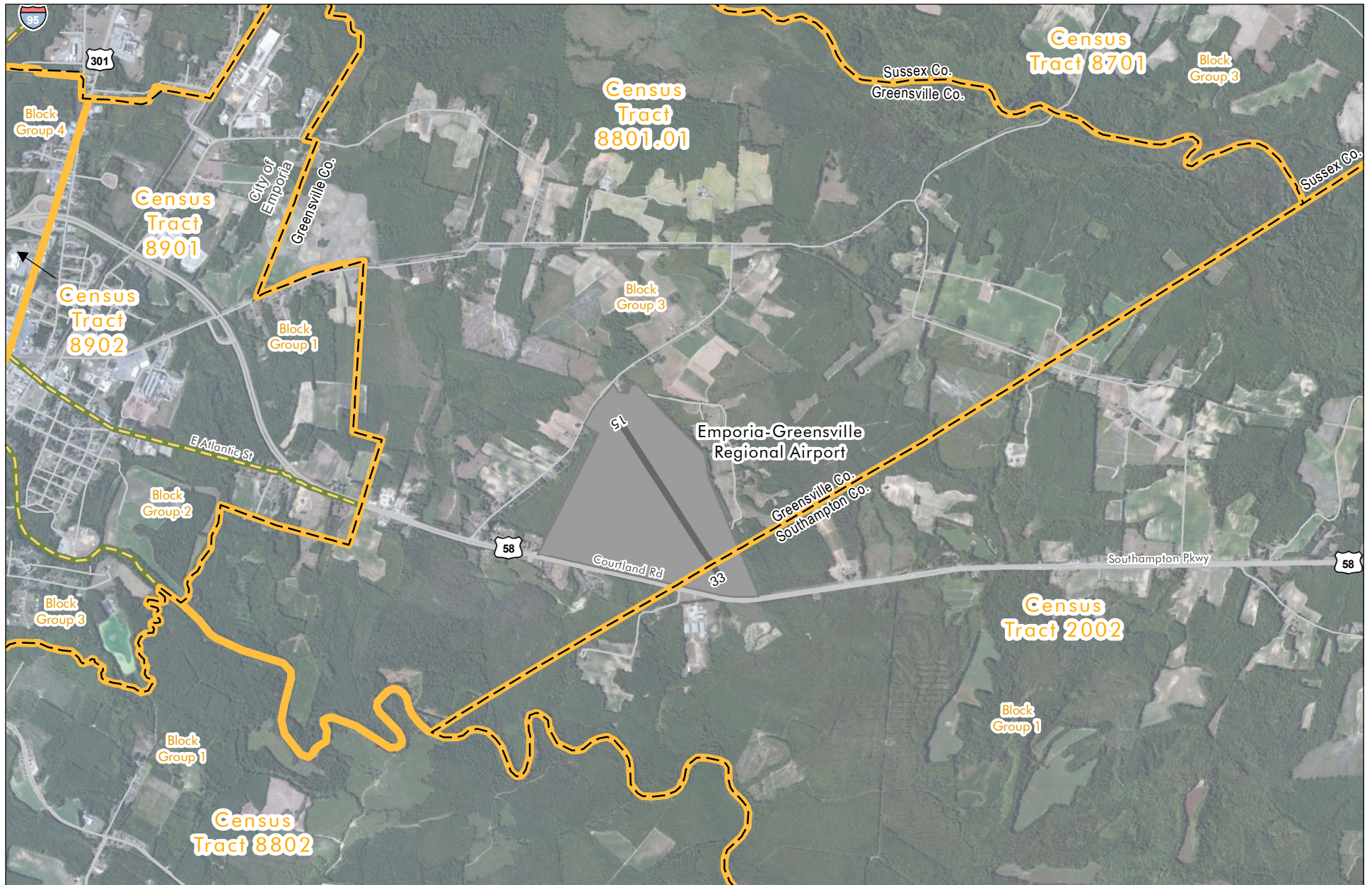
3.13.1.4 Protection of Children from Environmental Health Risks and Safety Risks

The study area for this analysis at Emporia-Greenville includes the census block groups within the greater than 65 dB DNL noise zone. Although larger than the study area, Greenville County, Southampton County, and the City of Emporia are described in this existing conditions section to provide context population and demographic data related to children for Virginia.

The age characteristics of the populations in the City of Emporia and Greenville and Southampton counties are examined and compared with data for Virginia in Table 3-38.

The City of Emporia has a larger proportion of children than that of Virginia. Although the actual number of children in the city—1,772 children—is small, they make up a slightly larger proportion of the population compared to Virginia as a whole.

The noise contours associated with existing aircraft operations at Emporia-Greenville are located entirely within airport property. Therefore, there are no existing disproportionately high and adverse environmental effects on children in the surrounding municipalities.



Source: US Census Bureau 2010; ESRI 2010; NAIP 2010.

- Emporia-Greenville Regional Airport
- Census Tracts
- Block Groups
- Major Highway
- Local Street
- County Boundary

Figure 3-27
Census Tracts and Block Groups
Emporia-Greenville Regional Airport

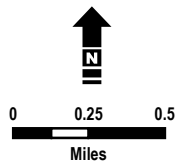


Table 3-38 Population and Demographic Data Related to Children, City of Emporia, Greenville County, and Southampton County, 2010

Location	Total Population	Population less than 21 Years Old ¹	Percent Less than 21 Years Old
Virginia	8,001,024	2,201,130	27.5
City of Emporia	5,927	1,772	29.9
Greenville County	12,243	2,399	19.6
Southampton County	18,570	4,537	24.4

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

Notes:

¹ EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, does not specify an age range for children. The U.S. EPA defines childhood as a series of lifestages, with the last lifestage ending at 21 years of age (U.S. EPA 2012).

3.13.2 Impacts on Socioeconomic Conditions at Emporia-Greenville Regional Airport

3.13.2.1 Housing

Emporia-Greenville is currently an operating airport facility, and the projected noise resulting from the proposed action would not extend significantly outside the airport property. Results of studies conducted on the effects of aircraft noise on property values have been inconclusive and suggest that numerous factors influence property values. Therefore, the potential increase in noise levels resulting from the proposed action would not be expected to have a significant impact on residential property values around Emporia-Greenville.

3.13.2.2 Community Services

Local community services (i.e., the Emporia Volunteer Fire Department, the Jarratt Volunteer Fire Department, Greenville Volunteer Rescue Squad, Lifestar Ambulance Service, Inc., and the Greenville County Sheriff's Department) have the capacity to provide emergency response services if needed; however, currently there are no emergency response services available at the airfield. Implementation of Alternative 1 would not result in an increase in the population served by these emergency responders and would not require the need for the local community services to hire new personnel or purchase new equipment.

However, with the expected increase in the number of operations at Emporia-Greenville, the potential for an emergency at the airfield slightly increases. Given the historical safety record of the E-2/C-2 aircraft, potential incidents requiring the response of emergency services would be expected to be infrequent. Alternative 1 would therefore have no significant impact on community services.

3.13.2.3 Environmental Justice

The type and intensity of effects of the proposed action on minority or low-income populations would be the same as those affecting individuals of all other ethnicities or income levels. The noise contours for Alternative 1 extend into Greenville County and Southampton County. The 65 dB DNL noise contour

extends into two census block groups; however, only one house (containing an estimated three people) is located within that contour. Table 3-39 presents data on the census block groups that are within the greater than 65 dB DNL noise zone under Alternative 1. As the noise contours do not extend into the City of Emporia, data related to the City of Emporia are not included in the table.

Table 3-39 Environmental Justice Statistics for Greenville County and Southampton County, 2010

Location	Total Population	Minority (Not Hispanic or Latino) ¹		Hispanic or Latino		Total Minority		Total Below Poverty Level ²	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Virginia	8,001,024	2,182,749	27.4	631,825	7.9	2,814,574	35.2	888,114	11.1
Greenville County	12,243	7,442	60.8	173	1.4	7,615	62.2	2,057	16.8²
Census Tract 8801.01, Block Group 3	688	534	77.6	6	0.9	540	78.5	81	11.8
Southampton County	18,570	7,229	38.9	203	1.1	7,432	40.0	2,934	15.8
Census Tract 2002, Block Group 1	1,269	669	52.7	25	2.0	694	54.6	249	19.6 ²

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 Census Summary File 1; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b); U.S. Census Bureau, 2005-2009 American Community Survey

Note:

- ¹ Percentages of minorities and Hispanic/Latino may not add up exactly to the total percentages of minorities due to rounding. In order to not double-count individuals, those who according to the U.S. Census were both minority and Hispanic or Latino were only included under Hispanic or Latino.
- ² Poverty data are not available at the block group level. Data are from the latest American Community Survey 5-Year Estimates for Greenville County (U.S. Census Bureau, 2005-2009 American Community Survey) and Southampton County (U.S. Census Bureau, 2006-2010 American Community Survey [a,b]). Data are for Census Tract 8801.01, which includes three block groups, and Census Tract 2002, which includes two block groups.

As shown in Table 3-39, Census Tract 8801.01, Block Group 3, has a higher percentage of minorities (not including individuals of Hispanic or Latino origin) than Greenville County. There is one house within this block group that is located within the greater than 65 dB DNL noise zone. Since census block groups are composed of individual blocks, the specific block where this house is located (Census Tract 8801.01, Block 3039) was identified. According to the U.S. Census, there are 50 individuals residing within that block, of whom 15 are minority. This would equate to 30 percent of the total population of the block. Based on this analysis, Census Tract 8801.01, Block 3039, which would be the affected geographic area, has a lower percentage of minorities than the census block group as a whole and Greenville County. Therefore, there would not be the potential for disproportionately high and adverse human health and environmental effects in Greenville County.

Census Tract 2002, Block Group 1, in Southampton County also has a higher percentage of minorities than the county. However, no houses are located within the greater than 65 dB DNL noise zone in Southampton County; therefore, there is also no potential for disproportionately high and adverse human health and environmental effects in Southampton County.

As noted in Section 1.4 of this document, interested people were invited to participate in informational open houses held in their communities regarding the

proposed action and findings in the Draft EA. Members of the public also had the opportunity to submit written comments for consideration in the Final EA. A total of 597 comments were received during the public review period, of which 124 dealt with Emporia-Greensville and 468 with WFF Main Base.

3.13.2.4 Protection of Children from Environmental Health Risks and Safety Risks

The noise contours for Alternative 1 extend into Greenville County and Southampton County. Table 3-40 presents data on the census block groups that are within the 65 dB DNL or greater noise zone.

Table 3-40 Protection of Children from Environmental Health Risks and Safety Risks: Statistics for Greenville County and Southampton County, 2010

Location	Total Population	Below 21 Years of Age	
		Population Less than 21 Years Old	Percent Less than 21 Years Old
Virginia	8,001,024	2,201,130	27.5
Greenville County	12,243	2,399	19.6
Census Tract 8801.01, Block Group 3	668	141	21.1
Southampton County	18,570	4,537	24.4
Census Tract 2002, Block Group 1	1,269	365	28.8

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 Census Summary File 1; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b); U.S. Census Bureau, 2005-2009 American Community Survey.

Census Tract 8801.01, Block Group 3, has a higher percentage of the population that is less than 21 years old than Greenville County as a whole. Given the very small number of people located within the 65 dB DNL noise contour in the Greenville County census block group (one house, containing an estimated three people) and that the noise would be temporary and intermittent the proposed action would have no significant impact on the protection of children from health and safety risks.

Also, as shown in Table 3-40, Census Tract 2002, Block Group 1, has a higher percentage of the population under the age of 21 than Southampton County. However, the 65 dB DNL or greater noise zone at Emporia-Greensville under Alternative 1 does not extend over any houses in Southampton County. Therefore, there would be no disproportionately adverse impact on children, and the proposed action would have no significant impact on the protection of children from health and safety risks.

3.13.3 Existing Socioeconomic Conditions at Wallops Flight Facility

3.13.3.1 Housing

Existing houses surrounding WFF Main Base are primarily located along sections of State Route 679 and Chincoteague Road (Route 175). The Chincoteague Bay Trails End development is a private waterfront campground resort development located north of WFF Main Base, with both cottages and mobile camper lots. According to a letter posted on the Trails End website (a copy of which was sent

to the Navy during the public comment period), Trails End is a recreational resort with over 2,500 lots consisting of a mixture of cottages, park-model trailers, and travel trailers (the majority are trailers or motor homes). The largest category of Trails End owners is “weekenders,” who primarily visit the community on weekends year-round and during vacations. The Trails End community association considers 300 of the 2,500 lots to be occupied full time. Olde Mill Pointe is a single-family residential development to the northwest of WFF Main Base consisting of 99 parcels. Thirteen of the 56 parcels currently available for development have been sold. Individual lots are privately owned and designed for single-family residences. These residences may be for year-round use or seasonal/occasional use (Olde Mill Pointe 2010). These areas are all within Accomack County, which is the Navy’s study area for housing. According to the U.S. Census, the five-year (2006-2010) average median home value for Accomack County is \$149,800 (U.S. Census Bureau, 2006-2010 American Community Survey [a]). High value homes in the Town of Chincoteague and elsewhere along the coastal waters of Accomack County create a median housing value that is most likely above the value of homes in the areas immediately surrounding WFF Main Base.

This section also presents an overview of the temporary lodging inventory (i.e., hotel and motel rooms) because of the potential for the Navy to temporarily detach Navy personnel to WFF should Alternative 2 be selected. The Town of Chincoteague, located 5 miles east of WFF Main Base, has at least 18 hotels/motels, and Accomack County has at least another six that could accommodate individuals working at WFF Main Base on a temporary basis.

3.13.3.2 Community Services

The study area for the community services analysis is WFF and Accomack County. Community services include publicly available benefits such as fire and emergency medical response and police protection.

WFF has a 24-hour fire department housed in two buildings: one located on WFF Main Base and one located on WFF Wallops Island. The department maintains seven firefighting vehicles that can use water or aqueous film-forming foam, as well as a hazardous materials spill response trailer. Emergency 911 calls made on WFF property are routed to the WFF fire department (JD2 Environmental, Inc. 2011). In addition to fire response, the trained personnel can provide emergency medical services and respond to hazardous materials accidents (NASA 2008a). They also have a mutual aid agreement with the Accomack-Northampton Fireman’s Association. Accomack County has 21 fire stations; the nearest to WFF Main Base are in the communities of Atlantic (3 miles south), Chincoteague (4 miles east), and New Church (4 miles northwest) (NASA 2005).

WFF has a health unit that is staffed by a full-time nurse and physician to provide first aid and immediate assistance in emergency situations. The health unit is open during business hours. After hours, emergency medical care is provided by the 24-hour fire department.

The closest hospital to WFF Main Base is McCready Memorial Hospital, located near the Virginia-Maryland state line in Crisfield, Maryland (approximately 35 miles by road), which has approximately 20 in-patient beds (The McCready Foundation n.d.). The only hospital on Virginia's Eastern Shore is Riverside Shore Memorial Hospital, which is located in the Town of Nassawadox, Northampton County (approximately 42 miles by road). The hospital has 143 certified beds (Shore Health Services n.d.). Shore Health Services, the local affiliate of Riverside Health System that owns and operates the hospital, decided in 2010 to build a new hospital, in the area between Keller and Parksley in Accomack County, which would have an estimated 78 beds (Riverside Shore Memorial Hospital 2010). Construction could begin as soon as the fall of 2012 (Jeter 2011); when completed, the new hospital would be approximately 26 miles from WFF Main Base by road. There are also two medical centers within 5 miles of WFF Main Base: Chincoteague Medical Center on Chincoteague Island and Atlantic Medical Center in Oak Hall (NASA 2008a).

The Accomack County Sheriff's Office's patrol deputies provide first response to all calls in the county, outside of incorporated towns that maintain their own police departments. The county sheriff's office has many other functions, including service of civil process, conducting criminal investigations, and providing courtroom security. The sheriff's office maintains a K-9 unit and two specialized teams, a tactical team (similar to a special weapons and tactics [SWAT] team) and a dive team (Accomack County Sheriff's Office 2011). Additionally, the Virginia State Police has a Bureau of Field Operations area office in the Town of Melfa, Accomack County. The Virginia State Police Bureau of Field Operations is primarily responsible for patrolling state roadways and interstate highways and providing criminal law enforcement as needed based on the availability of local law enforcement (Virginia State Police n.d.). The Town of Chincoteague has its own police department, which employs 11 officers to enforce criminal and traffic laws (Chincoteague, Virginia, 2010). WFF maintains a security force that provides 24-hour internal security for WFF. This includes security patrols, employee and visitor identification, and police services (NASA 2008a).

3.13.3.3 Environmental Justice

Environmental justice is achieved if minority and low-income communities are not subjected to disproportionately high or adverse environmental effects. To evaluate the potential impact of the action, each resource area's potential effect on the human population was considered. The potential impact to the noise environment from the Navy's proposed action was determined to be most appropriate for identifying potential minority or low-income populations. Therefore, the study area for the environmental justice analysis at WFF includes the census block groups within the greater than 65 dB DNL noise zone. Although larger than the study area, Virginia and Accomack County are described in this existing conditions section to provide context demographic data.

The race, ethnicity, and poverty status characteristics of the population in Accomack County are examined and compared with state data in Table 3-41. Figure 3-28 shows the census tracts and census block groups surrounding WFF.

Table 3-41 Demographic Data Related to Minority, Hispanic, and Low-Income Populations, Accomack County (2010)

Location	Total Population	Minority (Not Hispanic or Latino) ¹		Hispanic or Latino ²		Total Minority		Total Below Poverty Level ³	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Virginia	8,001,024	2,182,749	27.4	631,825	7.9	2,814,574	35.2	888,114	11.1
Accomack County	33,164	10,048	30.2	2,850	8.6	12,898	38.9	5,174	15.6
Census Tract 902, Block Group 2	3,043	815	26.8	91	3.0	906	29.8	332 ³	10.9 ³
Census Tract 902, Block Group 3	2,246	867	38.6	83	3.7	950	42.3	245 ³	10.9 ³
Census Tract 9802, Block Group 1	5	0	0.0	0	0.0	0	0.0	N/A ^{3,4}	N/A ^{3,4}

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

Notes:

¹ Minority populations include individuals who identify themselves as American Indian or Alaskan Native; Asian or Pacific Islander; African American, not of Hispanic origin; or Hispanic. In order to not double-count individuals, those who according to the U.S. Census were both minority and Hispanic or Latino were only included under Hispanic or Latino.

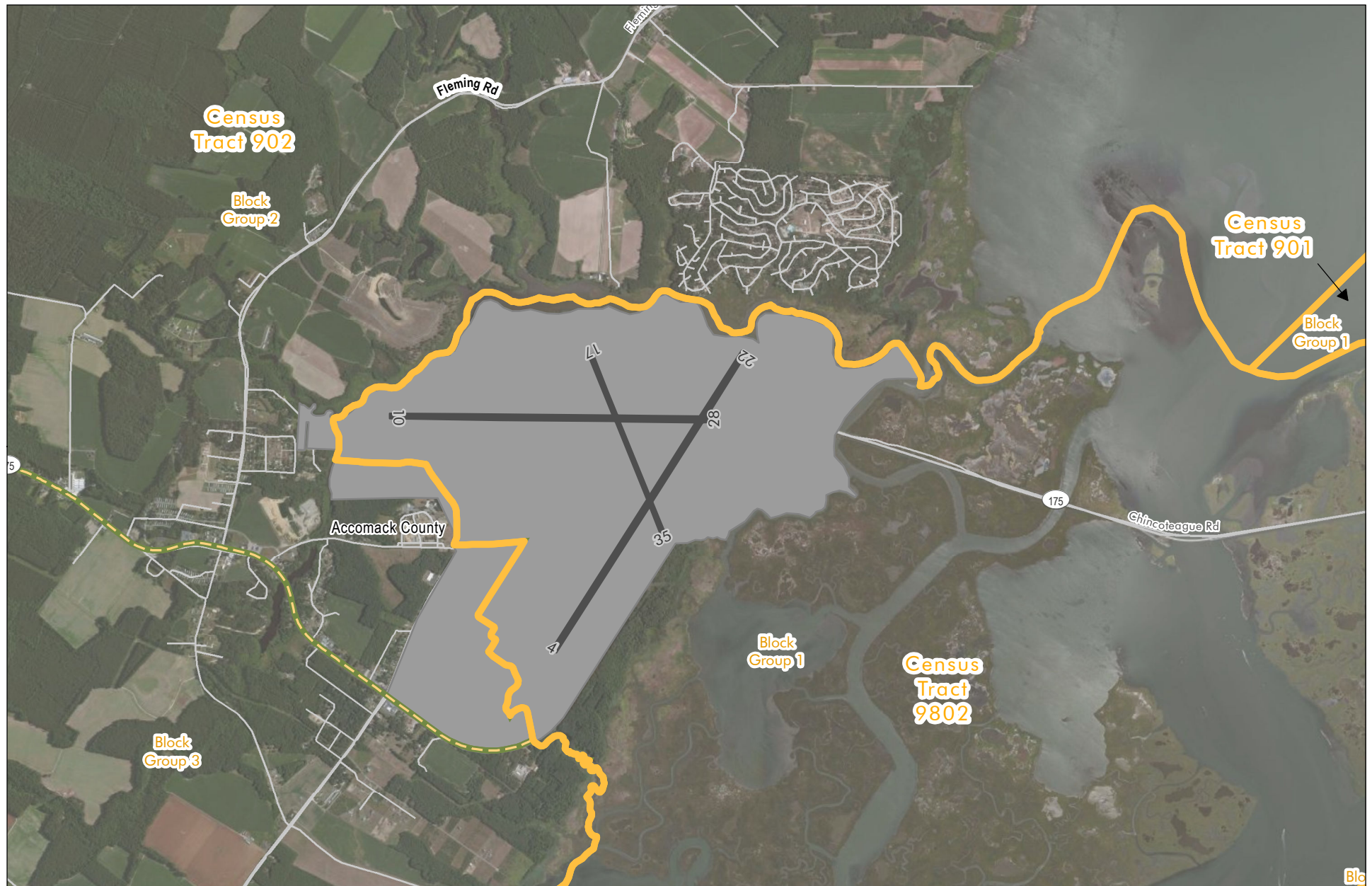
² Percentages of minorities and Hispanic/Latino may not add up exactly to the total percentages of minorities due to rounding.

³ Poverty data are not available at the block group level. Data are from the 2006-2010 American Community Survey 5-Year Estimates for Census Tract 902, which includes one additional block group (Block Group 3) and Census Tract 9802, which includes only one block group.

⁴ Datum is not applicable or not available.

Accomack County has a greater percentage of minorities, at 38.9 percent, than Virginia, at 35.2 percent. The minority population in Accomack County is predominantly African American, with African American people composing 27.9 percent of the total population. The county also has a greater percentage of people below the poverty level, at 15.6 percent, than the rest of Virginia, at 11.1 percent.

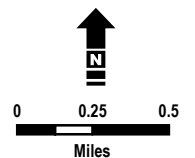
The existing noise contours are located entirely within Accomack County and do not extend into the Town of Chincoteague. Census block groups currently within or partially within the noise contours include Block Group 2 and Block Group 3 in Census Tract 902 and Block Group 1 in Census Tract 9802. NASA has prepared an Environmental Justice Implementation Plan to guide its response to potential disproportionately high and adverse environmental effects on minority and low-income communities in the surrounding municipalities from NASA-proposed actions.



Source: US Census Bureau 2010; ESRI 2010.

- Active Runway
- Census Tracts
- Major Highway
- Installation Area
- Block Groups
- Local Street

Figure 3-28
Census Tracts and Block Groups
 Wallops Flight Facility



3.13.3.4 Protection of Children from Environmental Health Risks and Safety Risks

The study area for this analysis at WFF Main Base includes the census block groups within the noise zones greater than 65 dB DNL as defined by the noise analysis. Although larger than the study area, Virginia and Accomack County are described in this existing conditions section to provide context population and demographic data related to children. The age characteristics of the population of children in Accomack County are examined and compared to state data in Table 3-42.

Table 3-42 Population and Demographic Data Related to Children, Accomack County (2010)

Location	Total Population	Population Less than 21 Years Old	Percent Less than 21 Years Old
Virginia	8,001,024	2,201,130	27.5
Accomack County	33,164	8,063	24.3
Census Tract 902, Block Group 2	3,043	649	21.3
Census Tract 902, Block Group 3	2,246	539	24.0
Census Tract 9802, Block Group 1	5	2	40.0

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

Note:

¹ EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, does not specify an age range for children. The U.S. EPA defines childhood as a series of lifestages, with the last lifestage ending at 21 years of age (U.S. EPA 2012).

Children make up 24.3 percent of the total population of Accomack County, which is a smaller percentage than that of children in Virginia, as shown in Table 3-42. The existing noise contours are located entirely within Accomack County and do not extend into the Town of Chincoteague. Census block groups currently within or partially within the noise contours include Block Group 2 and Block Group 3 in Census Tract 902 and Block Group 1 in Census Tract 9802.

3.13.4 Impacts on Socioeconomic Conditions at Wallops Flight Facility

3.13.4.1 Housing

Impacts to temporary housing availability at and in the vicinity of WFF Main Base are dependent on whether the Navy chooses to send detachments to WFF Main Base or conduct FCLP from NS Norfolk Chambers Field. In a non-detachment scenario, there would be no change in the permanent or transient population, so there would be no need for additional housing, either temporary or permanent. Potential noise impacts to housing values in the vicinity of WFF Main Base were analyzed for the non-detachment scenario.

WFF Main Base is currently an operating airfield facility, and the projected noise resulting from the proposed action would not be substantially different from existing conditions. Results of studies conducted on the effect of aircraft noise on

property values have been inconclusive and suggest that numerous factors influence property values. Therefore, the potential increase in noise levels resulting from the proposed action would not be expected to have a significant impact on residential property values around WFF Main Base.

In a detachment scenario at WFF Main Base, a maximum of 130 personnel would be housed in Navy lodging at the installation. Any personnel that could not be accommodated in the Navy lodging on the installation would stay in local hotels/motels. The local lodging establishments would be able to provide adequate capacity for Navy personnel not accommodated in Navy lodging. One exception to this lodging availability would potentially be the week of the Chincoteague Pony Penning and Carnival in the last week of July, when there are oftentimes limited hotel or motel vacancies. Therefore, the detachment scenario would have no impact on local lodging outside the week of the event in Chincoteague, Virginia.

3.13.4.2 Community Services

The proposed interagency agreement between the Navy and NASA for use of WFF Main Base, which would include the terms for services provided to the Navy by NASA, would include a provision for fire and emergency response services from WFF's on-site fire department and health unit and provision of police protection by WFF's security force. Mutual aid for emergency response, if required, would be provided by local fire companies through NASA's existing mutual aid agreement with the Accomack-Northampton Fireman's Association (JD2 Environmental, Inc. 2011). In the event of an emergency, patients requiring further medical care would be transported to Riverside Shore Memorial Hospital. McCready Memorial Hospital could also be utilized because of its proximity.

If Navy personnel were to be temporarily housed on WFF Main Base or in the surrounding community during detachment periods, the potential increase in calls for fire, emergency medical, and police response would be about the same as the impact from sporadic tourists in the area. Therefore, local emergency response organizations would not be expected to expend money on new personnel or equipment because there would be no increase in permanent population. Therefore, implementation of Alternative 2 at WFF would have no significant impact on community services.

3.13.4.3 Environmental Justice

The type and intensity of effects of the proposed action on minority or low-income populations would be the same as those affecting individuals of all other ethnicities or income-levels. The 65 dB DNL and above noise zone for Alternative 2 at WFF Main Base for both Runways 04/22 and 10/28 extend into Accomack County. Table 3-43 presents data on the census block groups that are within the greater than 65 dB DNL noise zone under Alternative 2. Note that Census Tract 902, Block Group 3, would only be affected if Runway 04/22 (Alternative 2, Scenario 1) is selected for E-2/C-2 FCLP.

Table 3-43 Environmental Justice Data for Accomack County, 2010

Location	Total Population	Minority (Not Hispanic or Latino) ¹		Hispanic or Latino		Total Minority		Total Below Poverty Level ²	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Virginia	8,001,024	2,182,749	27.4	631,825	7.9	2,814,574	35.2	888,114	11.1
Accomack County	33,164	10,048	30.2	2,859	8.6	12,898	38.9	5,174	15.6
Tract 902, Block Group 2	3,043	815	26.8	91	3.0	906	29.8	332	10.9 ²
Tract 902, Block Group 3	2,246	867	38.6	83	3.7	950	42.3	245	10.9 ²
Tract 9802, Block Group 1	5	0	0.0	0	0.0	0	0.0	N/A	N/A ^{2,3}

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 Census Summary File 1; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

Note:

- ¹ Percentages of minorities and Hispanic/Latino may not add up exactly to the total percentages of minorities due to rounding. In order to not double-count individuals, those who according to the U.S. Census were both minority and Hispanic or Latino were only included under Hispanic or Latino.
- ² Poverty data are not available at the block group level. Data are from the 2006-2010 American Community Survey 5-Year Estimates for Census Tract 902, which includes one additional block group (Block Group 3), and Census Tract 9802, which includes only one block group.
- ³ Data are not applicable or not available

When compared to Accomack County as a whole, Census Tract 902, Block Group 3, has a higher percentage of minorities (42.3 percent in the block group versus 38.9 percent in Accomack County). There are two houses within this block group that is located within the greater than 65 dB DNL noise zone for Alternative 2, Scenario 1. Since census block groups are composed of individual blocks, the specific block where these houses are located (Census Tract 902, Block 3112) was identified. According to the U.S. Census, there are 46 individuals residing within that block, of whom four are minority. This would equate to 8.7 percent of the total population of the block. Based on this analysis, Census Tract 902, Block 3112, which would be the affected geographic area, has a lower percentage of minorities than the census block group as a whole and Accomack County. Therefore, there would not be the potential for disproportionately high and adverse human health and environmental effects in Accomack County for Alternative 2.

As noted in Section 1.4 of this document, interested people were invited to participate in informational open houses to be held in their communities regarding the proposed action and findings in the Draft EA. Members of the public also had the opportunity to submit written comments for consideration in the Final EA. A total of 597 comments were received during the public review period, of which 124 dealt with Emporia-Greensville and 468 with WFF. Of the 468 comments related specifically to WFF Main Base, 419 were form letters from Chincoteague Bay Trails End Association, Inc., property owners, expressing concerns about noise, safety, biological resources, socioeconomics, and other personal issues. When individual comments were added to the form letters, those comments were read and considered in the Navy's revisions from the Draft to Final EA.

3.13.4.4 Protection of Children from Environmental Health Risks and Safety Risks

The noise contours for Alternative 2 at WFF Main Base for both the three-plane and three- and five-plane scenarios extend into Accomack County. Table 3-44 presents data on the census block groups that are within the 65 dB DNL or greater noise zone.

Table 3-44 Protection of Children from Environmental Health Risks and Safety Risks Statistics for Accomack County, 2010

Location	Total Population	Below 21 Years of Age	
		Population Less than 21 Years Old	Percent Less than 21 Years Old
Virginia	8,001,024	2,201,130	27.5
Accomack County	33,164	8,063	24.3
Tract 902, Block Group 2	3,043	649	21.3
Tract 902, Block Group 3	2,246	539	24.0
Tract 9802, Block Group 1	5	2	40.0

Sources: U.S. Census Bureau, 2010 Census; U.S. Census Bureau, 2010 Census Summary File 1; U.S. Census Bureau, 2010 American Community Survey; U.S. Census Bureau, 2006-2010 American Community Survey (a,b).

As shown in Table 3-44, Census Tract 9802, Block Group 1, has a higher percentage of children under the age of 21 than Accomack County. However, all of the people in this block group appear to be members of the same household, and this residence would not be within the modeled noise contours under any of the modeled scenarios. Block Groups 2 and 3 in Census Tract 902 have lower percentages of children under the age of 21 than the county; therefore, there would not be a disproportionately high and adverse effect on them, and the proposed action would have no significant impact on the protection of children from health and safety risks.

3.14 Environmental Management

This section outlines the regulatory provisions governing hazardous materials and hazardous waste. Under Alternative 1, the Navy would not station aircraft or personnel, and would not store any hazardous materials such as oil or hydraulic fluid at Emporia-Greenville. Therefore, environmental management (i.e., hazardous material and hazardous waste management) is not analyzed in this EA for Emporia-Greenville. Under Alternative 2, the Navy may temporarily station aircraft and personnel at WFF Main Base; therefore, the existing conditions for environmental management and potential impacts associated with Alternative 2 are discussed. The study area for hazardous materials, pollution prevention, and solid waste management is the boundary of the WFF Main Base property.

3.14.1 Existing Environmental Management at Wallops Flight Facility

WFF Main Base is classified as a large-quantity hazardous waste generator because it has the potential to generate more than 1,000 kilograms (approximately 2,200 pounds) of hazardous waste per month. In 2007, WFF Main Base

generated approximately 34,800 kilograms (76,800 pounds) of hazardous waste (NASA 2008c).

WFF Main Base stores its hazardous waste in two separate temporary (less than 90-day) accumulation areas: one for used oil and one for all other hazardous waste. Hazardous waste may be stored for up to 90 days from the date of initial accumulation. Prior to reaching 90 days from the date of initial accumulation, the waste is picked up by a licensed hazardous waste transporter and taken to a licensed treatment, storage, and disposal facility (NASA 2008c).

WFF maintains a pollution prevention plan that is reviewed annually. Recycling is a large part of the plan (NASA 2008c). It also has an integrated contingency plan, which satisfies the requirements of a Spill Prevention, Control, and Countermeasure Plan; an oil discharge contingency plan; and a hazardous waste contingency plan (NASA WFF 2011). Due to the use of radiation-emitting materials and equipment for research and development, WFF also has a radiation protection safety program (NASA 2008c).

Solid waste is collected in receptacles throughout the installation and disposed of offsite by a contractor. The facilities management department routinely inspects solid waste receptacles to ensure that recyclables and hazardous wastes are not being disposed of in them. Receptacles for recyclables are readily available throughout the installation (NASA 2008c). Satellite accumulation areas, for hazardous waste headed toward the 90-day accumulation areas, are located in specified work areas (NASA 2008c).

3.14.2 Impacts on Environmental Management at Wallops Flight Facility

Under Alternative 2, the Navy could temporarily station aircraft and personnel at WFF Main Base. This would require storage of hazardous materials associated with maintenance of the aircraft. These materials would be stored in a hazardous material storage locker within the airfield hangar utilized by the Navy during the detachment period. The locker would be expected to measure approximately 200 cubic feet in size.

For hazardous materials disposal, the Navy would have four 55-gallon hazardous materials waste disposal cans. Waste placed in these cans would enter the established WFF hazardous waste disposal program, described in Section 3.14.1. WFF's hazardous waste disposal program has capacity for the waste; therefore, there would be only a minor impact on hazardous materials management at the airfield. The Navy would follow WFF's established pollution prevention plan, so there would be no significant impact on pollution prevention at the airfield.

The temporary and periodic nature of the detachments would not be anticipated to significantly impact solid waste generated at WFF Main Base.

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4

Comparison of Environmental Impacts

This chapter provides a summary and comparison of the environmental impacts that could result from the proposed action at Emporia-Greenville Regional Airport or WFF and the No Action Alternative.

4.1 Alternative 1: Emporia-Greenville Regional Airport

The environmental impacts of the Navy's implementation of Alternative 1 at Emporia-Greenville are presented in detail in Section 3. This section provides an overall summary related to the construction impacts and aircraft operations impacts to the resource areas. No significant impacts to resources were identified at Emporia-Greenville associated with implementation of the Navy's proposed action.

Under Alternative 1, there are two potential operational scenarios. The analysis in Section 3 reaches the same conclusion of no significant impact under either Scenario 1 or 2.

4.1.1 Construction Impacts

Under Alternative 1, there would be airfield modifications at Emporia-Greenville to accommodate E-2/C-2 FCLP operations. This would include installation of concrete pads, runway markings, runway lighting, and utility trenching; thus, there would be minor short-term impacts to such resources as soils, air quality, and vegetation. In addition, there would be minor, long-term impacts to vegetation and stormwater management from the installation of concrete pads. However, the proposed airfield improvements would not result in any significant impacts to resources present at Emporia-Greenville due to the limited construction footprint associated with the airfield improvements (an estimated 0.43 acre), the avoidance of wetlands, and the fact that there is no habitat for any federally protected species at Emporia-Greenville.

4.1.2 Aircraft Operation Impacts

Under Alternative 1, the Navy would conduct up to 45,000 E-2/C-2 aircraft operations related to FCLP at Emporia-Greenville. The airfield would continue to be utilized by the existing fixed-wing and rotary-wing aircraft that operate at Emporia-Greenville, which includes an estimated 2,320 annual operations; thus, total annual operations would be approximately 47,320.

The proposed aircraft operations at Emporia-Greenville could result in minor, intermittent, direct impacts to aircraft operations and safety during times of Navy FCLP. There would also be minor direct impacts to noise and air quality for the duration of the action (up to 10 years). Specifically for noise, this includes an additional 40.5 acres and 44.0 acres of land under Scenario 1 and Scenario 2, respectively, that would be within the greater than 65 dB DNL noise zone, off of Emporia-Greenville property.

Potential indirect impacts to land use, socioeconomics, and biological resources could result from implementation of the Navy's proposed action. However, the impacts to these resources would be minimal and/or intermittent, as discussed in detail in Section 3, and would not be considered significant.

4.2 Alternative 2: Wallops Flight Facility

The environmental impacts of the Navy's implementation of Alternative 2 at WFF Main Base are presented in detail in Section 3. This section provides an overall summary related to the construction impacts and aircraft operations impacts to the resource areas. The analysis did not identify any significant impacts to resources at WFF Main Base associated with implementation of the Navy's proposed action.

Under Alternative 2, there are two potential operational scenarios. The analysis noted in Section 3 reaches the same conclusion of no significant impact for both Scenario 1 and 2.

In a detachment situation at WFF Main Base, personnel, aircraft, and support equipment may remain in the local area during the training period. The impacts associated with Alternative 2 are generally consistent whether the Navy chooses to detach to WFF Main Base or send aircraft from NS Norfolk Chambers Field. In a detachment situation at WFF Main Base, personnel would find accommodations in on-installation Navy housing or in the local community. The temporary and periodic nature of the detachments is not anticipated to significantly impact local hotel accommodations and may be considered a benefit to several local businesses.

4.2.1 Construction Impacts

Under Alternative 2, there would be airfield modifications at WFF Main Base to accommodate E-2/C-2 FCLP operations. This would include concrete pads, runway markings, runway lighting, and utility trenching; thus, there would be minor short-term impacts to such resources as soils, air quality, and vegetation. In addition, there would be minor, long-term impacts to vegetation and stormwater management from the installation of concrete pads. However, the proposed airfield improvements would not result in any significant impacts to resources present at WFF Main Base due to the limited construction footprint associated with the airfield improvements (up to an estimated 0.05 acre), the avoidance of wetlands, and a finding of no effect on federally protected species that may be present in the vicinity of WFF Main Base.

4.2.2 Aircraft Operation Impacts

Under Alternative 2, the Navy would conduct up to 45,000 E-2/C-2 aircraft operations related to FCLP at WFF Main Base. The airfield would continue to be utilized by the existing fixed-wing and rotary-wing aircraft that operate at WFF Main Base, which includes an estimated 13,074 annual operations; thus, total annual operations would be approximately 58,074. Navy aircraft operations constitute the majority of the current airfield activity at WFF Main Base. Additional operations associated with the Navy's proposed action would be similar to those currently being conducted and would also result in some operations being conducted after dark.

The proposed aircraft operations at WFF Main Base could result in minor, intermittent, direct impacts to aircraft operations and safety during times of Navy FCLP. There would also be minor direct impacts to noise and air quality for the duration of the action (up to 10 years). Specifically for noise, an additional 208.7 acres and 155.1 acres of land under Scenario 1 and Scenario 2, respectively, would be within the greater than 65 dB DNL noise zone, outside of WFF Main Base property. Potential indirect impacts to land use, socioeconomics, and biological resources could result from implementation of Alternative 2. However, the impacts to these resources would be minimal and/or intermittent, as discussed in detail in Section 3, and would not be considered significant.

4.3 No Action Alternative

As stated in Section 2.2.3, under the No Action Alternative, the Navy would not use the airfield facilities at Emporia-Greenville or WFF Main Base for E-2/C-2 FCLP. E-2/C-2 squadrons, operating from NS Norfolk Chambers Field, would continue to use NALF Fentress alongside other aircraft for FCLP operations. E-2/C-2 FCLP operations would also be conducted at NAS Oceana and/or through periodic out-of-area detachments to complete training requirements when scheduling or capacity issues arise at NALF Fentress. The airfield would continue to be used by the existing aircraft that currently operate at Emporia-Greenville or WFF Main Base under the No Action Alternative.

The No Action Alternative is required to be evaluated in this EA to serve as a benchmark for decision-makers to compare the potential environmental effects of the proposed action and alternatives.

4.4 Comparison of Alternatives

Table 4-1 presents a comparison of the environmental consequences of the alternatives being evaluated as part of this EA.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Aircraft Operations and Airspace			
Airspace and Aircraft Operations	No significant impact. There would be a minor impact as the runway would be closed to non-FCLP arrivals and departures, except in the case of an emergency.	No significant impact. There would be a minor impact as the runway being used by the Navy for FCLP would be closed to non-FCLP participants, except in the case of an emergency.	No change from existing conditions.
Safety			
Airfield RPZs	No significant impact. There would be no change to the size or shape of the RPZs at Emporia-Greenville.	No significant impact. There would be no change to the size or shape of the Potential Accident Zones or clear zones associated with WFF Main Base.	No change from existing conditions.
Aircraft Mishap Potential and Emergency Response	No significant impact. It is unlikely, but possible that a mishap involving the E-2/C-2 aircraft resulting in loss of life, permanent total disability, destruction of the aircraft, or off-station property damage would occur at Emporia-Greenville during the proposed operations.	No significant impact. It is unlikely, but possible that a mishap involving the E-2/C-2 aircraft resulting in loss of life, permanent total disability, destruction of the aircraft, or off-station property damage would occur at WFF Main Base during the proposed operations.	No change from existing conditions.
Bird/Animal Aircraft Strike Hazard	No significant impact. There could be a minor increase in the probability of a BASH incident as a result of the increase in air operations at Emporia-Greenville.	No significant impact. There could be a minor increase in the probability of a BASH incident as a result of the increase in air operations at WFF Main Base.	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Air Quality			
	<p>No significant impact. The air emissions resulting from the short-term construction and annual aircraft operations are below thresholds for all criteria pollutants.</p> <p>Emporia-Greenville is located in a region that is in attainment of the National Ambient Air Quality Standards; therefore, the proposed action at this location is exempt from the Federal and State general conformity regulations.</p>	<p>No significant impact. The air emissions resulting from the short-term construction and annual aircraft operations are below thresholds for all criteria pollutants.</p> <p>WFF Main Base is located in a region that is in attainment of the National Ambient Air Quality Standards; therefore, the proposed action at this location is exempt from the Federal and State general conformity regulations.</p>	<p>No change from existing conditions.</p>

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Noise			
	<p><i>Alternative 1, Scenario 1</i> No significant impact. The increase in land area within the greater than 65 dB DNL noise zone would be 40.6 acres. Approximately three individuals in Greenville County (i.e., approximately 0.02 percent of the total county population) would be impacted. Less than half of the modeled points of interest would experience higher maximum modeled SEL values compared to existing conditions.</p> <p>One residence would be located within the 65 dB DNL noise contour.</p> <p><i>Alternative 1, Scenario 2</i> No significant impact. The increase in land area within the greater than 65 dB DNL noise zone would be 44.0. As under Scenario 1, one residence would be located in the 65 dB DNL noise contour.</p>	<p><i>Alternative 2, Scenario 1</i> No significant impact. The increase in land area within the greater than 65 dB DNL noise zone would be approximately 208.8 acres for Scenarios 1. There would be an estimated 268 more individuals, or approximately 0.8 percent of the total population in Accomack County within the greater than 65 dB DNL noise zone.</p> <p><i>Alternative 2, Scenario 2</i> No significant impact. The increase in land area within the greater than 65 dB DNL noise zone would be approximately 155.2 acres. There would be an estimated 173 more, or approximately 0.5 percent of the total population in Accomack County within the greater than 65 dB DNL noise zone.</p>	<p>No change from existing conditions.</p>

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Land Use			
Existing Land Uses	<p><i>Alternative 1, Scenario 1 and Scenario 2</i> No significant impact. The increase of 0.8 acre, for Scenario 1 and Scenario 2, of land designated as residential land use within the modeled 65 dB DNL or greater noise zone could be considered negative, but not significant given the small size of the area, the current aircraft activity, and the general noise environment already present at Emporia-Greenville, and would not require mitigation by the Navy. FAR Part 150 designates the 65 dB DNL contour as the cumulative noise exposure level above which residential land uses would not be considered compatible. While this impact could be considered negative, it would not be considered significant given the small size of the area, the current aircraft activity, and the general noise environment already present at Emporia-Greenville, and would not require mitigation by the Navy. The Emporia-Greenville Regional Airport Commission has agreed to purchase the property under their authority and convert the land use to non-residential use. There are no additional houses, schools, day care centers, or hospitals located within the 65 dB DNL or greater noise zone.</p>	<p><i>Alternative 2, Scenario 1 and Scenario 2</i> No significant impact. The increase in residential land area would be located in areas immediately adjacent to the airport property and could be considered negative, but not significant considering WFF Main Base is an existing, active airfield that currently has 125.7 acres of residential lands within the existing 65 dB DNL or greater noise contour, and due to the limited increase in the size of the noise contour over baseline conditions at WFF Main Base. No religious facilities, schools, day care centers, or hospitals are within the greater than 65 dB DNL noise zone.</p>	<p>No change from existing conditions.</p>

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Existing Land Uses (continued)	<i>Comprehensive Plans</i> No significant impact. The proposed action would be compatible and consistent with the comprehensive plans for the City of Emporia, Greenville County, and Southampton County.	<i>Comprehensive Plans</i> No significant impact. The proposed action would be compatible and consistent with the comprehensive plan for Accomack County.	No change from existing conditions.
Virginia Coastal Zone Management	Not Applicable.	No significant impact. The VDEQ concurred that the Navy's proposed action at WFF Main Base is fully consistent with the enforceable policies of the Commonwealth of Virginia's federally approved Coastal Zone Management Program.	No change from existing conditions.
Infrastructure and Utilities			
	No significant impact. Personnel-related infrastructure improvements would not be needed. Telephone service and electricity needed for FCLP would operate within existing capacity.	No significant impact. Telephone service and electricity needed for FCLP would operate within existing capacity. Under a non-detachment scenario, personnel-related infrastructure improvements would not be needed. Under a detachment scenario, up to 130 personnel would be staying in established lodging facilities that have adequate electric and telephone capacity.	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Visual Landscape: Light Emissions and Visual Impacts			
	No significant impact. During FCLP training, the existing airport runway lights would be turned off and only the flush carrier deck box lighting would be used. No increase in off-site lighting would be projected from either airfield. Due to the topography of the sites, little lighting from FCLP operations would be visible from beyond the airport. The communities surrounding Emporia-Greenville are generally accustomed to seeing aircraft operating in the area, as it is an active airfield.	No significant impact. During FCLP training, the existing airport runway lights would be turned off and only the flush carrier deck box lighting would be used. No increase in off-site lighting would be projected from either airfield. Due to the topography of the sites, little lighting from FCLP operations would be visible from beyond the airport. The communities surrounding WFF Main Base are generally accustomed to seeing aircraft operating in the area, as it is an active airfield.	No change from existing conditions.
Geology, Topography, and Soils			
Geology	No significant impact. No deep excavations would be required to complete the proposed action.	No significant impact. No deep excavations would be required to complete the proposed action	No change from existing conditions.
Topography	No significant impact. These impacts are a result of minor excavations for the placement of underground utility lines.	No significant impact. These impacts are a result of minor excavations for the placement of underground utility lines.	No change from existing conditions.
Soils	No significant impact. These short-term impacts are a result of exposing soils to wind and stormwater erosion, compaction, and rutting and would be limited to the period of construction.	No significant impact. These short-term impacts are a result of exposing soils to wind and stormwater erosion, compaction, and rutting and would be limited to the period of construction.	No change from existing conditions.
Water Resources			
Floodplains	No significant impact. Construction would not occur in a floodplain.	No significant impact. Construction would not occur in a floodplain.	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Wetlands	No significant impact. No new construction is proposed within wetlands.	No significant impact. No new construction is proposed within wetlands.	No change from existing conditions.
Stormwater	No significant impact. There would be the creation of 0.43 acre of new, completely impervious surface associated with the Navy's proposed action (This is the sum of both new impervious surface and the conversion of partially pervious surface to completely impervious surface). A Stormwater Pollution Prevention Plan would not be required, but an erosion control plan would be prepared to minimize stormwater runoff.	No significant impact. There would be an addition of up to 0.05 acre of impervious surface associated with the Navy's proposed action. Neither a Stormwater Pollution Prevention Plan nor an erosion control plan would be required.	No change from existing conditions.
Biological Resources			
Vegetation	No significant impact. Temporary impacts on maintained grassland would result from the installation of buried utility lines.	No significant impact. Temporary impacts on maintained grassland would result from the installation of buried utility lines.	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Marine Mammals, Birds, and Other Wildlife	<p>No significant impact. <i>Marine Mammals</i> No marine mammals exist at or in the vicinity of Emporia-Greenville.</p> <p><i>Birds and Other Wildlife</i> The increase in noise from aircraft operations could have direct impacts on wildlife; however, scientific literature indicates that intensities and durations of wildlife startle responses decrease with the number and frequency of exposures. Most wildlife in the vicinity of Emporia-Greenville would likely already be or become acclimated to aircraft noise.</p>	<p>No significant impact. <i>Marine Mammals (and Fish)</i> The bottlenose dolphin is the only marine mammal species expected to occur in the waters of Chincoteague Bay adjacent to WFF. When compared to baseline/existing conditions at WFF, the change in the projected noise contours would be negligible; therefore, it would be unlikely that a bottlenose dolphin or fish would be in the proposed action impact area during Navy overflights. Moreover, any bottlenose dolphins or fish occurring regularly in Chincoteague Bay are already habituated to aircraft activity and noise from current and ongoing aircraft overflights, as well as rocket noise from Wallops Island. Therefore, the increase in aircraft operations at WFF Main Base would not result in Level A or Level B harassment to the bottlenose dolphin, as defined under the Marine Mammal Protection Act.</p> <p><i>Birds and Other Wildlife</i> Aircraft would fly over the Wallops Island National Wildlife Refuge and a portion of the Barrier Island/Lagoon System Important Bird Area. However, the flights under the proposed action would be temporary and intermittent in nature. It is also expected that most birds/wildlife in these areas are already habituated to the aircraft noise from existing</p>	<p>No change from existing conditions.</p>

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Marine Mammals, Birds, and Other Wildlife (continued)	An increase in air operations could result in a minor increase in the potential of an in-air bird strike at Emporia-Greenville; however, BASH management measures would be implemented, and standard operating procedures would be followed to minimize the strike risk.	<p>operations at WFF Main Base and rocket launches from Wallops Island.</p> <p>The increase in noise from aircraft operations could have direct impacts on wildlife; however, scientific literature indicates that intensities and durations of wildlife startle responses decrease with the number and frequency of exposures. Most wildlife in the vicinity of WFF Main Base would likely already be, or would become, acclimated to aircraft noise.</p> <p>An increase in air operations due to the Navy's proposed action could result in a minor increase in the potential of an in-air bird strike; however, BASH management measures are already in place at WFF, and the base has an active management team along with standard operating procedures to minimize the strike risk.</p> <p>Given the current air operations at WFF under baseline/existing conditions, bald eagles nesting near WFF are likely habituated to aircraft activity and noise. Pursuant to the Migratory Bird Treaty Act, 16 U.S.C. 703-712, and the Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668d, there would be no "takes" or significant impacts to the bald eagles occurring near WFF.</p>	

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Protected Species	<p>No significant impact.</p> <p>Federally threatened or endangered species were identified as potentially occurring in the vicinity of Emporia-Greenville. However, no suitable habitat for the identified species occurs within the action areas or would be affected by the implementation of Alternative 1. Therefore, the increase in aircraft operations at Emporia-Greenville would be expected to have no effect on federally listed species under the Endangered Species Act, 16 U.S.C. 1531.</p>	<p>No significant impact.</p> <p>Although sea turtles and two federally protected fish species (Atlantic and shortnose sturgeons) have been known to occur in Chincoteague Bay near WFF, sea turtles are not known to nest on the shores near WFF. When compared to baseline/existing conditions at WFF, the change in the projected noise contours would be negligible; therefore, it would be unlikely that a sea turtle or sturgeon would be in the proposed action impact area during Navy overflights. Moreover, any sea turtles or sturgeon occurring regularly in Chincoteague Bay are already habituated to aircraft activity and noise from current and ongoing aircraft overflights, as well as rocket noise from Wallops Island. Therefore, the increase in aircraft operations at WFF Main Base would be expected to have no effect on sea turtles and sturgeons under the Endangered Species Act, 16 U.S.C. 1531.</p>	<p>No effect.</p>

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Cultural Resources			
Archaeological and Architectural Resources	<p>No significant impact. The proposed action would not result in any new archaeological impacts given the minor airfield modifications under the Navy's proposed action.</p> <p>No significant impact. No effect on any architectural resources at Emporia-Greenville Regional Airport either individually eligible for inclusion in the National Register of Historic Places or that constitute an eligible historic district.</p> <p>No significant impact. No new or different indirect visual or auditory impacts in the Emporia-Greenville area of potential effect.</p>	<p>No significant impact. The proposed action would not result in any new archaeological impacts given the minor airfield modifications under the Navy's proposed action.</p> <p>No significant impact. No effect on any architectural resources at WFF Main Base either individually eligible for inclusion in the National Register of Historic Places or that constitute an eligible historic district.</p> <p>No significant impact. No new or different indirect visual or auditory impacts in the WFF Main Base area of potential effect.</p>	No change from existing conditions.
Socioeconomics			
Housing	<p>No significant impact. One residence is located within the greater than 65 dB DNL noise zone. Studies have not identified a conclusive relationship between noise and property values, and the noise zones do not increase significantly over baseline conditions.</p>	<p>No significant impact. Studies have not identified a conclusive relationship between noise and property values, and the noise zones do not increase significantly over baseline conditions.</p> <p>If the Navy decides to send detachments to WFF Main Base, they will be primarily housed in on-installation Navy lodging and the local community would have adequate capacity to accommodate Navy personnel when there is not sufficient vacancy at the installation.</p>	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Community Services	No significant impact. An increase in aircraft operations at Emporia-Greenville would not be expected to require expenditures of new personnel or equipment.	No significant impact. An increase in aircraft operations at WFF Main Base would not be expected to require expenditures of new personnel or equipment.	No change from existing conditions.
Environmental Justice	No significant impact. To evaluate the potential of an impact to minority and low-income populations, the greater than 65 dB DNL noise zone was utilized. As demonstrated in the analysis of other resource areas, impacts related to Alternative 1 are negligible and therefore are not evaluated further in the context of impacts to potential environmental justice populations. An evaluation of census block group and block level data indicated that there is not a minority or low-income population in the greater than 65 dB DNL noise zone that exceeds that of the community of comparison (Greenville or Southampton county) on a percentage basis.	No significant impact. To evaluate the potential of an impact to minority and low-income populations, the greater than 65 dB DNL noise zone was utilized. As demonstrated in the analysis of other resource areas, impacts related to Alternative 2 are negligible and therefore are not evaluated further in the context of impacts to potential environmental justice populations. An evaluation of census block group and block level data indicated that there is not a minority or low-income population in the greater than 65 dB DNL noise zone that exceeds that of the community of comparison (Accomack County) on a percentage basis.	No change from existing conditions.
Protection of Children from Environmental Health and Safety Risks	No significant impact. A disproportionately high and adverse effect would not be anticipated.	No significant impact. A disproportionately high and adverse effect would not be anticipated.	No change from existing conditions.

Table 4-1 Comparison of Environmental Consequences

Resource Area	Alternative 1 Emporia-Greenville Regional Airport	Alternative 2 Wallops Flight Facility	No Action Alternative
Environmental Management			
Hazardous Materials, Pollution Prevention, and Solid Waste	Not Applicable.	<p><i>Hazardous Materials</i> No significant impact. There would be no impact on hazardous materials.</p> <p><i>Pollution Prevention</i> No significant impact. WFF has an established Spill Prevention, Control and Countermeasure Plan that would be followed.</p> <p><i>Solid Waste</i> No significant impact. Under a detachment scenario, an additional 130 personnel staying at WFF or in the vicinity of the installation would generate additional solid waste; however, they would be staying in established lodging facilities that have adequate capacity to dispose of solid waste.</p>	No change from existing conditions.

5

Cumulative Impacts

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7). Reasonably foreseeable future actions include planned or proposed projects but do not include speculative, remote, hypothetical, or contingent projects, which need not be considered in a cumulative impact analysis. If the Navy’s proposed action does not result in a direct or indirect impact on a resource area, then no further analysis of potential cumulative effects to that resource is necessary.

Cumulative impacts can result from individually minor but collectively significant actions by various agencies (federal, state, and local) or individuals that take place over time. Significance of the cumulative impacts of the proposed action and other actions is determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 CFR 56003, Nov. 29, 1978], which, in part, notes that significance is determined based on whether the action is related to other actions with individually insignificant but cumulatively significant impacts.

A cumulative impact analysis identifies and defines the scope of other actions and their interrelationship with the proposed action and alternatives. 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 a similar time period, and they may be temporary or permanent. Actions overlapping with or in proximity to the proposed alternatives would be expected to have more potential for a relationship than those more geographically separated.

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the timeframe in which the impacts could be expected to occur. Cumulative impacts may be temporary or permanent. It is possible that analysis of cumulative impacts may go beyond the scope of the project-specific direct and indirect impacts to include expanded geographic and time boundaries and a focus on broad resource sustainability. This “big picture” approach is becoming increasingly important as growing evidence suggests that the most significant impacts result not from the direct impact of a particular action but from the combination of individual, often minor, impacts of multiple actions over time.

The underlying issue is whether or not a resource can adequately recover from the impact of an action before the environment is exposed to a subsequent action or actions.

Under the proposed action for this EA, the timeframe for construction-related cumulative impacts resulting from modifications to airfield facilities would start in the spring of 2013 and continue to July 2013. Construction-related cumulative impacts related to the proposed action could be both short term (e.g., air emissions from construction equipment) and long term (e.g., an increase in impervious surfaces). The timeframe for cumulative impacts resulting from E-2/C-2 operations would start in the summer of 2013 and continue for a period of up to 10 years to 2023 (the potential total term of the airfield lease or interagency agreement).

In general, the Navy analyzes the effects of individual actions that are similar or related to their proposed action. This analysis may be qualitative rather than quantitative when data on the environmental effects of past actions are insufficient. The combined effects of past actions were incorporated into the existing environment section within individual resource sections. Ongoing impacts of recently completed or initiated actions are analyzed to the extent that they may be additive to the impacts resulting from implementation of Alternative 1 or Alternative 2. Analysis of cumulative impacts primarily includes past, present, and reasonably foreseeable future actions that may have impacts similar to those identified under the alternatives analysis and that should be evaluated together in order to determine whether additive impact to a resource could be experienced.

Resource-specific geographic study areas for this cumulative impact analysis are defined for Emporia-Greenville and WFF Main Base in Sections 5.1.2 and 5.2.2, respectively.

5.1 Emporia-Greenville Regional Airport

5.1.1 Description of Other Projects

The Navy identified and evaluated past, ongoing, and reasonably foreseeable future actions that have or could have a potential cumulative impact with Alternative 1 at Emporia-Greenville. Other projects were identified by meetings and phone calls with county and airport commission representatives and review of local land use plans and project-specific environmental documents.

A limited number of general aviation aircraft operations occur at Emporia-Greenville annually; therefore, facility development and modification to the airfield are correspondingly limited. Furthermore, the airfield is located in a rural area with little recent or planned development in the immediate vicinity. The Navy has identified two ongoing projects and one planned project in the vicinity of the airfield that may have cumulative impacts with Alternative 1. Table 5-1 and Section 5.1.1.1 and 5.1.1.2 describe these projects and the specific resource areas that may be cumulatively impacted by these projects and Alternative 1.

Figure 5-1 shows the locations of the planned projects. Note that existing airfield operations at Emporia-Greenville would be expected to continue during non-FCLP periods.

Table 5-1 Other Projects for Cumulative Impacts Analysis, Emporia-Greenville

Action Proponent (Agency/Individual)	Project Name	Location	Year Occurred / To Occur	Resources Potentially Cumulatively Impacted
Present/Ongoing				
Oak Grove Baptist Church	Construction	James River Junction (Rural Secondary Route 623)	Ongoing	Air Quality, Noise, Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian)
Greenville County, City of Emporia, and Brunswick County	Mid-Atlantic Advanced Manufacturing Center	Off Interstate 95, approximately 5 miles north of Emporia-Greenville	Ongoing	Air Quality
Reasonably Foreseeable				
Emporia-Greenville	Runway Shift	Emporia-Greenville	2017-2027	Aircraft Operations and Airspace, Safety, Air Quality, Noise, Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian)
Emporia-Greenville	Parachute/Paraglide and related airborne jump training	Emporia-Greenville	October 2011-September 2013	Aircraft Operations and Airspace, Safety, Air Quality, Noise, Biological Resources (Vegetation, Wildlife, Avian)

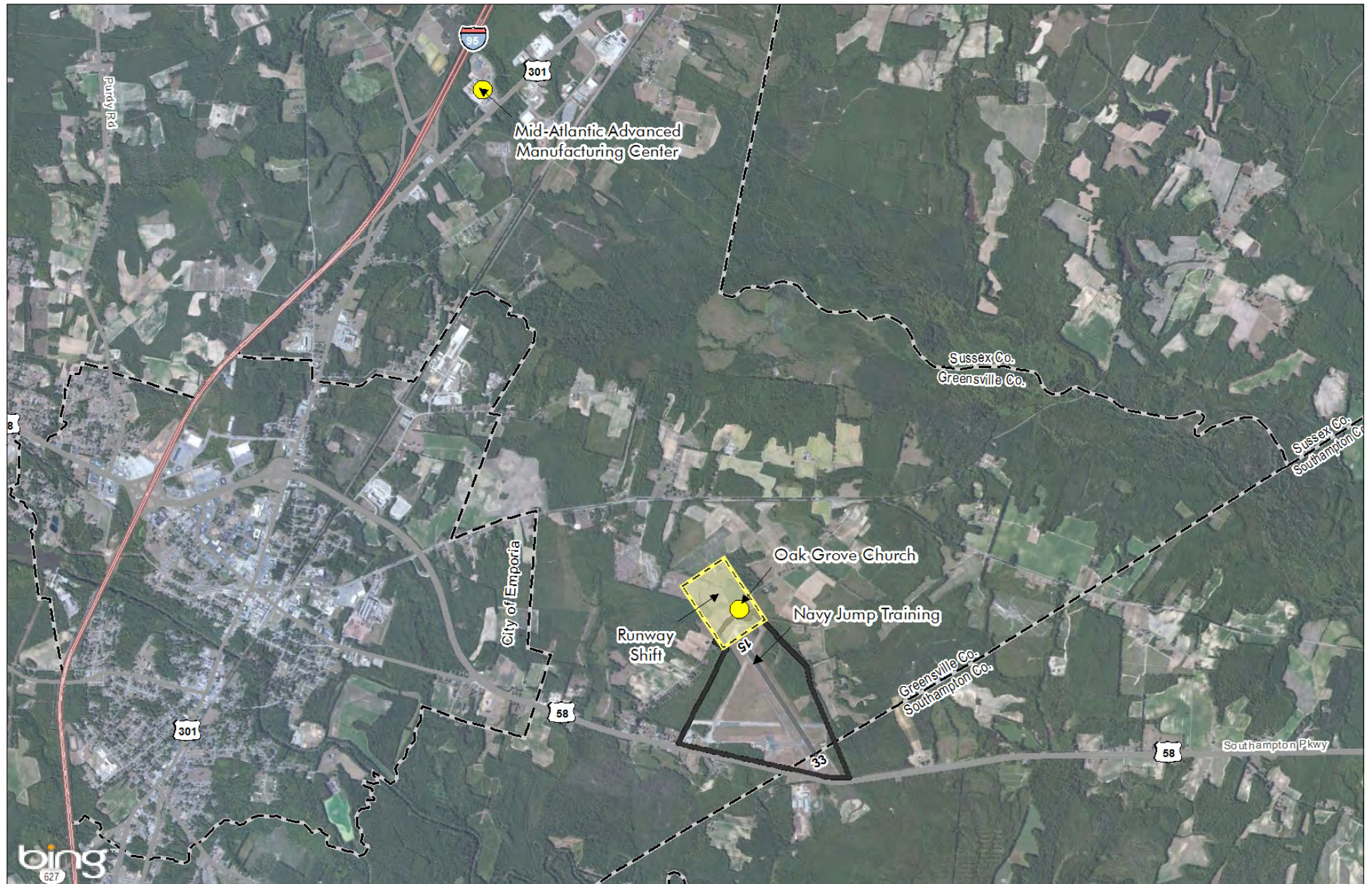
5.1.1.1 Ongoing Projects

Oak Grove Baptist Church Construction

Reconstruction of Oak Grove Baptist Church is planned for the area north of Runway 15/33 on James River Junction (Rural Secondary Route 623) on the site of the former church building (see Figure 5-1). The previous church building has been razed, and a foundation has been laid for the new church building.

Mid-Atlantic Advanced Manufacturing Center

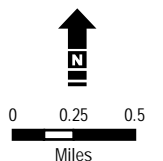
The Mid-Atlantic Advanced Manufacturing Center is an industrial park consisting of approximately 1,545 acres. This facility is located along Interstate 95 near Otterdam Road in Greenville County, approximately 5 miles north of Emporia-Greenville. The property has been designed for heavy industrial use, such as automotive assembly. This project is a regional economic development initiative of Greenville County, the City of Emporia, and Brunswick County. The county is currently marketing this site to industries (BillBolling.com 2011).



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

Figure 5-1
Other Projects On and Around
Emporia-Greensville Regional Airport

- | | |
|--------------------------------------|-----------------|
| Runway Projects | County Boundary |
| Active Runway | Interstate |
| Emporia-Greensville Regional Airport | Major Highway |
| | Local Street |



5.1.1.2 Reasonably Foreseeable Projects

Emporia-Greenville Runway Shift

The airport commission is preparing an EA to evaluate the potential environmental impacts associated with extending the approach end of Runway 15 and reclaiming an equal length of runway to comply with FAA design standards.

The purpose of the proposed runway shift would be to move Runway 15/33 to the northwest in order to create additional clearance between the active runway and U.S. Route 58 to the south. This would potentially allow for completion of perimeter fencing along the airport property boundary. The airport commission's EA evaluates three action alternatives and a "no build" alternative. The airport commission's preferred alternative is to displace the threshold for Runway 15 by 187 feet to the northwest (effectively extending the runway length by 187 feet). To bring the runway into compliance with FAA design standards, 187 feet of the approach end of Runway 33 will be marked as a displaced threshold (the southeastern end of the runway). The pavement marked as a displaced threshold would not be available for use during takeoff or landing operations. This pavement, if maintained, could be used as part of the taxiway system for aircraft entering or exiting the active runway.

This project would include acquisition of private property by the airport commission for the extended runway and relocation of the Runway Safety Area and Runway Object-Free Area. Tall vegetation within the Runway Safety Area and Runway Object-Free Area would be removed. As a result of the property acquisition and runway shift, James River Junction (Rural Secondary Route 623) would be realigned to the northwest (Bland n.d.).

Parachute/Paraglide and Related Airborne Jump Training

The Navy has an agreement with Emporia-Greenville to perform Parachute/Paraglide and Related Airborne Jump Training ("jump training") at the airport. During jump training periods, the Navy, in coordination with the airport, will exercise control over the airport, as necessary. The Navy is responsible for coordinating training periods with the airport prior to performing jump training and for notifying other airport users of closures by publishing a NOTAM. Under this agreement, the Navy would minimize impacts to existing airport traffic as much as possible.

5.1.2 Cumulative Impact Analysis by Resource

The resources that may have the potential for a cumulative impact from the Navy's proposed action and other past, ongoing, or reasonably foreseeable future actions include aircraft operations and airspace, safety, air quality, noise, land use, visual landscape, and biological resources. The following resources are discussed in this EA but are not discussed in Section 5 because the Navy's proposed action would have either no impact or a negligible impact, and therefore there is no combined cumulative impact: infrastructure and utilities; geology, topography, and soils; water resources; cultural resources; socioeconomic resources; and environmental management.

5.1.2.1 Aircraft Operations and Airspace

Alternative 1 would not change civilian access to the airspace surrounding Emporia-Greenville. No airspace designations would be permanently changed because the Navy's proposed action would be temporary, scheduled, and communicated to other operators in advance. Therefore, there would be no impacts to airspace and, thus, no cumulative impacts to airspace. The geographic study area evaluated for cumulative impacts to aircraft operations is the airfield at Emporia-Greenville. The Emporia-Greenville runway shift and Navy jump training exercises have the potential to cumulatively impact aircraft operations in connection with the proposed action.

Navy Proposed E-2/C-2 FCLP Operations

Alternative 1 would have minor impacts to existing operations because aircraft would not be able to utilize the runway at Emporia-Greenville during Navy FCLP operations.

Other Projects

The proposed runway shift would positively impact aircraft operations in the long term because it would bring the distance between the runway and U.S. Route 58 up to FAA design standards. In the short term, there would be periods of time during construction when the airfield at Emporia-Greenville would be unavailable for aircraft operations. The Navy jump training would require that the airport be closed to other operations during training periods, impacting existing operations temporarily.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Assuming that construction of the runway shift begins and that Navy jump training occurs before the Navy's lease for FCLP expires, the combined impact of the construction period for the runway shift project, the jump training exercises, and the proposed Navy FCLP operations could increase the total amount of time the runway at Emporia-Greenville would be unavailable. Work on the runway would be temporary, as would jump training exercises. While the Navy would require the capability to use Emporia-Greenville 24 hours per day and seven days per week for FCLP operations, the Navy would not use the airport all day or every day. Training would generally be scheduled Monday through Friday in three-hour periods. Thus, the cumulative impact on aircraft operations would be temporary and not result in a significant cumulative impact on use of the runway.

5.1.2.2 Safety

The geographic study area evaluated for cumulative impacts to safety is the airfield property and RPZs at Emporia-Greenville. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact safety in connection with the proposed action are those that would increase the risk of an aviation mishap.

Navy Proposed E-2/C-2 FCLP Operations

The Navy will employ standard air traffic management techniques (i.e., issuing NOTAMs, monitoring the airfield UNICOM frequency, and notifying non-

participating aircraft that the airfield is closed) during FCLP operations to minimize interaction with private aircraft. The increase in air operations at Emporia-Greenville would result in a minor increase in the potential for a BASH incident to occur; however, under Alternative 1, BASH management measures would be provided by the airfield or through a third-party services contract.

Other Projects

The runway shift project would minimize the potential for a BASH incident to occur at Emporia-Greenville, by bringing the runway at Emporia-Greenville into compliance with FAA design standards by creating additional clearance between the active runway and U.S. Route 58, which would improve safety conditions at the airfield. Relocation of the RPZs as part of this project would not impact safety. Navy jump training would result in an increase to air operations at Emporia-Greenville; however, the Navy will employ standard air traffic management techniques (i.e., issuing NOTAMs, monitoring the airfield UNICOM frequency, and notifying non-participating aircraft that the airfield is closed) during jump training operations to minimize interaction with private aircraft.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

None of the other projects identified in Section 5.1.1 would, cumulatively with the proposed action, result in a significant cumulative impact on safety at Emporia-Greenville. The BASH management measures that would be employed under Alternative 1 and the runway shift project together could have a beneficial impact on safety by reducing the risk of a BASH incident at the airfield and increasing the safety of the runway. FCLP would be conducted under visual flight rules with the responsibility for all aircraft to see and avoid conflicting traffic. Additionally, as provided in airfield NOTAMs, non-FCLP aircraft will be restricted from the airport pattern during FCLP operations, and, as Navy pilots would conduct FCLP under SOPs, to include monitoring airfield UNICOM frequency, the risk of interaction with non-FCLP aircraft would be considered negligible.

5.1.2.3 Air Quality

The geographic study area evaluated for cumulative impacts to air quality includes Greenville County and Southampton County because air quality standards are tracked at the county level. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact air quality in connection with the proposed action are those that would generate air emissions either during construction, operation, or both, including the Emporia-Greenville runway shift project, Navy jump training, build-out of the Mid-Atlantic Advanced Manufacturing Center, and construction of Oak Grove Baptist Church. Existing emissions sources in the two counties include transportation sources, building use, and industrial sources. Based on available information regarding future development, emissions from mobile and stationary sources, including current airport operations, in the counties would be expected to remain near their current levels. Greenville County and Southampton County are in attainment for all National Ambient Air Quality Standards. Both counties are

rural with minimal existing air emissions compared to the total emissions in the Commonwealth of Virginia (see Section 3.4.1).

Navy Proposed E-2/C-2 FCLP Operations

As discussed in Section 1.5.2, mobile and temporary source emissions are not subject to the Prevention of Significant Deterioration standards; however, the Prevention of Significant Deterioration thresholds provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards. Under Alternative 1, both temporary construction emissions and annual operating emissions are projected to be between less than 1 ton per year and approximately 63 tons per year for all criteria pollutants and therefore would have no significant impact on air quality in the region.

Aircraft operations generate greenhouse gas emissions from the ground level and in transit from NS Norfolk Chambers Field.² Alternative 1 would generate temporary construction emissions and redistribute existing aircraft operations in transit. Ground level emissions from construction and vehicles would be minimal, and these temporary emissions would not have long-term climate impacts. The total greenhouse gas emissions generated by FCLP operations currently represent an insignificant fraction of global greenhouse gas emissions, and relocating these operations to Emporia-Greenville would not produce a significant change in global climate change.

Other Projects

As noted above, both counties are in attainment for all National Ambient Air Quality Standards. Due to the rural nature of the two counties, emissions from transportation (including vehicle and aircraft operations), building use, and industrial sources are minimal. The two counties are expected to remain largely rural into the foreseeable future, and air emissions from all sources are not expected to increase significantly above current levels.

The Emporia-Greenville runway shift project, build-out of the Mid-Atlantic Advanced Manufacturing Center, and construction of Oak Grove Baptist Church would all generate temporary construction emissions. These projects would be small scale and of temporary duration for construction.

Other existing civilian and military aircraft operations at Emporia-Greenville, including Navy jump training, would be expected to continue at the same levels in the foreseeable future. There are no other foreseeable actions that could result in cumulative impacts to air quality from aircraft operations. Current aircraft operations would not be expected to increase in the foreseeable future. There are no other airports located within Greenville County or Southampton County, so

² Federal agencies are required to address emissions of greenhouse gases with analysis and emission reduction planning by EO 13514 (*Federal Register* 2009) and the Energy Policy Act of 2005, and CEQ guidance has recommended the analysis of direct and indirect emissions from proposed actions to provide meaningful information to the decision-makers and the public (CEQ 2010). Energy (fuel) use also is considered, based on the recommendations of EO 13514.

existing and on-going impacts to air quality resulting from aircraft operations in these two counties are assumed to be minimal.

One large, planned industrial park in Greenville County, the Mid-Atlantic Advanced Manufacturing Center, has the potential to increase mobile-source emissions from truck, privately-owned vehicle, and rail traffic in the region if it is fully developed. In addition, the potential for employment opportunities associated with this project could result in an increase in traffic and emissions associated with this traffic. The industrial park is located on Interstate 95, approximately 5 miles north of Emporia-Greenville, and could increase traffic and associated emissions on the interstate and U.S. Route 58.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Under Alternative 1, both temporary construction emissions and annual operating emissions are projected to be between less than 1 ton per year and approximately 63 tons per year for all criteria pollutants and therefore would have no significant impact on air quality in the region.

Considered together, Alternative 1 and the other projects within the study area would not be expected to significantly increase air emissions in Greenville County and Southampton County during the operational period of the proposed action. While full build-out of the Mid-Atlantic Advanced Manufacturing Center would increase mobile-source emissions in Greenville County, the county is projected to remain rural, and the county's population is not expected to increase (Virginia Employment Commission 2012). Therefore, cumulative emissions resulting from the other projects described above and Alternative 1 would not result in significant cumulative impacts to air quality.

Alternative 1 and the other projects identified above would not significantly increase new emission sources subject to evaluation under the Mandatory Greenhouse Gas Reporting Rule (see Section 3.4 for a description of this regulation). Greenhouse gas emissions are by nature global and cumulative, as individual sources of greenhouse gas emissions are not large enough to have an appreciable effect on climate change. A significant impact on global climate change could only occur when the greenhouse gas emissions of a proposed action combine with greenhouse gas emissions from other man-made activities on a global scale. Even when considering the projects together, negligible global-scale changes to greenhouse gas emissions would occur.

5.1.2.4 Noise

The geographic study area evaluated for cumulative impacts to the noise environment is the area within the greater than 65 dB DNL noise contours associated with Navy FCLP operations (see Figures 3-10 and 3-11). The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact noise along with the proposed action are those that would generate noise during construction or on-going operation, including the Emporia-Greenville runway shift, reconstruction of the Oak Grove Baptist Church, Navy jump training, and existing airport operations. Additionally, Emporia-Greenville

is located next to U.S. Route 58; traffic on the highway would continue to be part of the cumulative noise environment at the airfield into the foreseeable future.

Navy Proposed E-2/C-2 FCLP Operations

The increase in land area falling under the greater than 65 dB DNL noise contour at Emporia-Greenville due to the proposed Navy E-2/C-2 operations would equate to approximately 40.5 and 44.0 acres for Scenarios 1 and 2, respectively. In both cases, this would impact approximately three individuals in Greenville County (i.e., approximately 0.02 percent of the total county population). For the SEL analysis, the maximum modeled noise experienced from single aircraft events as heard from 28 different points of interest was quantified. Slightly more than half of the points of interest would experience higher maximum modeled SEL values under Alternative 1 than they currently experience. Note that modeling of proposed operations assumed existing operations would continue at current annual levels.

Under both scenarios, the overall change in the noise conditions would be small both in the number of newly affected individuals within the DNL noise contours and in the noise exposure from single-event noise (i.e., maximum modeled SEL). The Navy's proposed FCLP operations would be temporary and intermittent in nature. They would be conducted primarily during daytime hours and include three-hour blocks of aircraft operations followed by periods of minimal or no aircraft activity. Therefore, there would be no significant impact from noise as a result of the Navy's implementation of Alternative 1 for either scenario.

Other Projects

The Emporia-Greenville runway shift and the reconstruction of Oak Grove Baptist Church would both result in a temporary increase in noise due to construction. Construction noise would be generated primarily from operation of light and heavy construction equipment and project-related vehicle traffic. Both types of noise would occur near the proposed project location during daylight working hours and would typically be intermittent. If implemented, Navy jump training could result in additional operational noise. However, jump training has not been performed to date by the Navy at Emporia-Greenville, and there are no plans to do so in the near future, which would mean no additional noise would be generated.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The planned runway shift, reconstruction of the Oak Grove Baptist Church, and Navy jump training could occur during the period of the Navy's lease at Emporia-Greenville for FCLP and could occur simultaneously with construction of the proposed airfield-associated modifications or Navy FCLP operations. Construction would occur only during daylight hours, so construction potentially would overlap with FCLP operations only during daytime training periods. Noise from construction would normally be intermittent because construction equipment would not be operating constantly. When construction and FCLP operations would be occurring simultaneously, noise levels would increase slightly at nearby residences, churches, and other noise receptors. Construction noise would add to

noise generated by Navy FCLP operations, but the additive effect would be temporary and intermittent in nature. As noted previously, FCLP operations would be conducted primarily during daytime hours and in three-hour periods followed by periods of limited or no aircraft activity, and current operations would be expected to continue at the same annual level; therefore, the same amount of annual noise would be generated. Therefore, cumulative impacts to the noise environment associated with construction noise and aircraft noise from existing operations and FCLP operations would not be significant.

5.1.2.5 Land Use

The geographic study area evaluated for cumulative impacts to land use at Emporia-Greenville is the area within the modeled 65 dB DNL and greater noise contour. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact noise along with the proposed action are those that would increase the acreage of incompatible land uses within the study area.

Navy Proposed E-2/C-2 FCLP Operations

Alternative 1 would not have direct impacts to land use. Under either operational scenario, less than 1 acre of residential land would be in the modeled noise zones. This residential land would not be considered compatible under FAR Part 150 Program land use recommendations; however, the acreage of residential land in the modeled noise zones would be small compared to the entire study area (40.5 acres under Scenario 1 and 44.0 acres under Scenario 2).

Other Projects

None of the other projects identified in Section 5.1.1 would increase the acreage of incompatible land uses in the modeled noise zones.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Because no other projects would increase the acreage of incompatible land uses in the modeled noise zones, there would be no cumulative impacts with the proposed action to land use.

5.1.2.6 Visual Landscape

The geographic study area evaluated for cumulative impacts to the visual landscape at Emporia-Greenville is anywhere within the viewshed of the airfield property. The reconstruction of Oak Grove Baptist Church and the Emporia-Greenville Airport Commission runway shift project have the potential to cumulatively impact the visual landscape in combination with the proposed action.

Navy Proposed E-2/C-2 FCLP Operations

Airfield-associated modifications under Alternative 1 would be consistent with the visual setting of the airfield. Although there would be an increase in the total number of aircraft operations at Emporia-Greenville under Alternative 1, the Navy conducting temporary, intermittent FCLP with E-2/C-2 aircraft would not be a significant impact.

Other Projects

The reconstruction of Oak Grove Baptist Church would be consistent with the visual landscape that existed in the area before the building was razed. The runway shift proposed by the airport commission would be consistent with the visual setting of the Emporia-Greenville airfield.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The Navy's proposed action, the reconstruction of Oak Grove Baptist Church, and the Emporia-Greenville Airport Commission Runway Shift project would all be consistent with the visual landscape of the area. Emporia-Greenville is an active airfield used by propeller aircraft and military helicopters, so the communities surrounding the airfield generally are accustomed to seeing aircraft operations. Therefore, there would not be significant cumulative impacts to the visual landscape under Alternative 1.

5.1.2.7 Biological Resources

The geographic study area evaluated for cumulative impacts to biological resources, including wildlife, avian resources, federally threatened and endangered species, and state threatened and endangered species, is the area within Emporia-Greenville's modeled greater than 65 dB DNL noise contours under Alternative 1. Past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact biological resources in connection with the proposed action are the Oak Grove Baptist Church construction, the Emporia-Greenville runway shift project, and Navy jump training.

Navy Proposed E-2/C-2 FCLP Operations

Construction could result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Non-avian and avian wildlife would be impacted by loss of habitat from construction and noise from air operations. These impacts would not be expected to be significant. Given the current aircraft operations at Emporia-Greenville, most wildlife present at or in the vicinity of the airport likely would be already acclimated to aircraft noise. Wildlife not already acclimated to aircraft noise would be expected to acclimate or habituate to noise exposure after experiencing short-term effects. Alternative 1 would have no effect on the federally listed red-cockaded woodpecker, Roanoke logperch, American chaffseed, and Michaux's sumac because these species would not be expected to be found within the study area.

Other Projects

The Oak Grove Baptist Church construction, Emporia-Greenville runway shift project, and Navy jump training would have impacts on non-avian and avian wildlife. Construction could result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Non-avian and avian wildlife would be impacted by loss of habitat and temporary noise impacts during

construction. These impacts would be minor and would not be expected to occur simultaneously. Navy jump training operations would not be expected to impact non-avian and avian species because, given the current aircraft operations at Emporia-Greenville, most wildlife present at or in the vicinity of the airport likely would be already acclimated to aircraft noise. Wildlife not already acclimated to aircraft noise would be expected to acclimate or habituate to noise exposure after experiencing short-term effects. Because the Oak Grove Baptist Church construction, the Emporia-Greenville runway shift project, and Navy jump training occur within Emporia-Greenville's modeled 65 dB DNL noise contours under Alternative 1 (i.e., the same area evaluated for the proposed action), impacts to threatened and endangered species from these projects would not be expected because no threatened and endangered species would be expected to occur in the area.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The Navy's proposed action under Alternative 1 would have no effect on federally listed threatened and endangered species or impacts on state-listed threatened and endangered species; therefore, there would be no cumulative impacts associated with these resources. Construction associated with the Navy's proposed action, the Oak Grove Baptist Church construction, and the Emporia-Greenville runway shift project each would affect a relatively small area. Similar habitats are abundant in the surrounding area, so the cumulative impacts related to construction are not expected to be significant. Because wildlife likely are habituated to noise generated by existing civilian aircraft and helicopters and would be expected to habituate to noise generated by Navy jump training and E-2/C-2 aircraft operations, cumulative impacts to non-avian and avian wildlife from aircraft noise would not be expected.

5.2 Wallops Flight Facility

5.2.1 Descriptions of Other Projects

The Navy identified and evaluated past, ongoing, and reasonably foreseeable future actions that have or could have a potential cumulative impact under Alternative 2 at WFF Main Base. Other projects were identified by meetings and phone calls with county and WFF representatives and review of local land use plans and project-specific environmental documents.

WFF is in the process of expanding and modifying its facilities to support new missions; at the same time, surrounding property in Accomack County is being developed for residential uses as well as institutional, industrial, and commercial uses related to the missions supported by WFF. The Navy has identified multiple ongoing or planned projects that may have cumulative impacts with Alternative 2. These projects are described in Table 5-2 and Sections 5.2.1.1 and 5.2.1.2.

Table 5-2 Other Projects for Cumulative Impacts Analysis, Wallops Flight Facility

Action Proponent (Agency/Individual)	Project Name	Location	Year Occurred / To Occur	Resources Potentially Cumulatively Impacted
Present/Ongoing				
NASA, the Marine Science Consortium, and Accomack County	Build-out of Wallops Research Park	Wallops Research Park, west of and adjacent to WFF off of State Route 798	2008/ongoing	Aircraft Operations and Airspace, Safety, Air Quality, Noise, Land Use, Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian)
NASA and the Mid-Atlantic Regional Spaceport	Expansion of the WFF Launch Range	WFF Wallops Island	2009/ongoing	Noise, Biological Resources (Wildlife, Avian, Sea Turtles)
NASA	WFF Alternative Energy Project	WFF Main Base	Ongoing	Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian)
Grand Bay Properties and private individuals	Construction of residences at Olde Mill Pointe	Located northwest of and adjacent to WFF off of State Route 679	Ongoing	Air Quality, Noise, Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian)
NASA	Unmanned Aerial Systems Airstrip	WFF Wallops Island	Ongoing	Aircraft Operations and Airspace, Noise
NASA	Shoreline Restoration and Infrastructure Protection Program	WFF Wallops Island	Initial construction and fill completed; other phases ongoing	None
Reasonably Foreseeable				
NASA	Site-wide PEIS	WFF	Beginning in 2013 and continuing over a 20-year planning horizon (NASA August 3, 2011)	Aircraft Operations and Airspace, Safety, Air Quality, Noise, Visual Landscape, Biological Resources (Vegetation, Wildlife, Avian, Threatened and Endangered Species)

The table also lists resources that may be cumulatively impacted by each project and Alternative 2. Figure 5-2 shows the locations of identified projects on WFF and in the surrounding area of Accomack County. (Note: NASA's Programmatic Environmental Impact Statement [PEIS] evaluating proposed infrastructure and facility changes in support of the growing mission base at WFF is scheduled for release to the public in early 2013. As a result, the locations of individual construction, modification, and demolition projects are not shown on Figure 5-2). Existing airfield operations at WFF would be expected to continue during non-FCLP periods.

5.2.1.1 On-Going Projects

NASA, the Marine Science Consortium, and Accomack County Build-out of Wallops Research Park

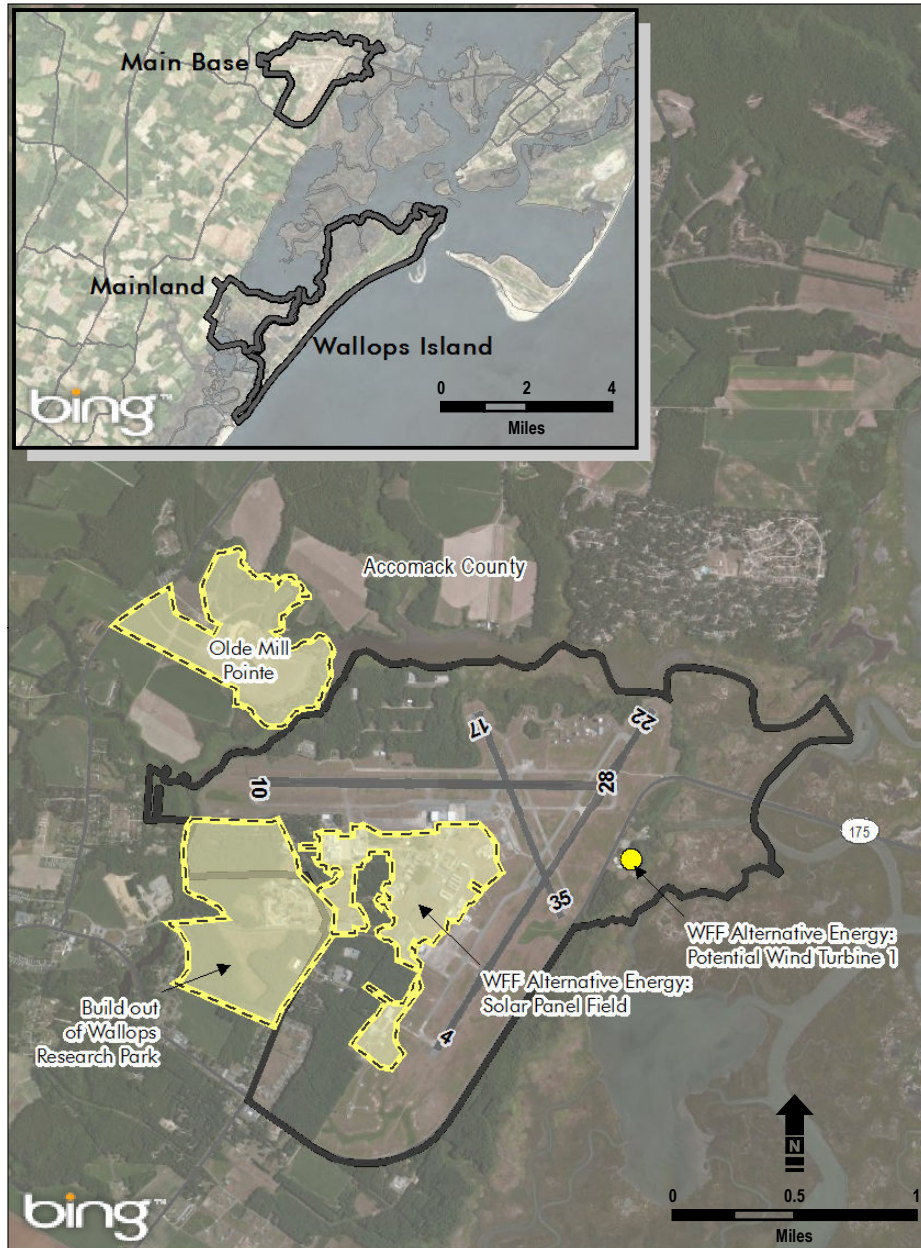
NASA prepared an EA in 2008 to analyze development of a research park adjacent to WFF on approximately 202 acres of land owned by NASA, the Marine Science Consortium, and Accomack County. The Wallops Research Park would be a multi-use development, including space for science research and development; industrial, aviation, and educational facilities; and recreational areas. Roads would be constructed and utilities installed to support this development. Full build-out of the Wallops Research Park is expected to take 20 years (NASA 2008c). Land within the Wallops Research Park owned by NASA primarily would be used by aerospace activities, including aircraft operation and maintenance. Operation of the Wallops Research Park would result in an additional 15 flights per year from WFF (NASA 2008c).

NASA and the Mid-Atlantic Regional Spaceport Expansion of the Wallops Flight Facility Launch Range

This project expanded the launch range at Wallops Island and upgraded NASA and Mid-Atlantic Regional Spaceport facilities to accommodate a wider variety of launch vehicles and payloads. Construction planned as part of the expansion included minor modifications to the north boat dock; construction of a payload processing facility, a payload fueling facility, a horizontal integration facility, and launch pad infrastructure; construction of new roads and minor upgrades to existing roads; and minor modifications to the interiors of existing facilities. To date, the horizontal integration facility, launch pad infrastructure, and modifications to the interiors of existing facilities have been completed. Mid-Atlantic Regional Spaceport constructed a new launch complex and liquid fueling facility in approximately the same location as Pad 0-A (see Figure 5-2). Operations that are supported by these improvements include testing, fueling, and processing operations; up to two static fire tests per year; and launching of up to six expendable launch vehicles and associated spacecraft per year (NASA 2009b).

NASA WFF Alternative Energy Project

NASA is planning to install a system of solar panels capable of generating 10 gigawatt-hours per year of electricity and two 2.4 kilowatt residential-scale wind turbines. If, in the future, NASA determines that solar energy is economically viable at WFF, the agency would install approximately 38,000, 15-square-foot panels on approximately 80 acres. The panels would be spaced to avoid shading



Source: ESRI 2010; Microsoft Virtual Earth Online Mapping System 2009.

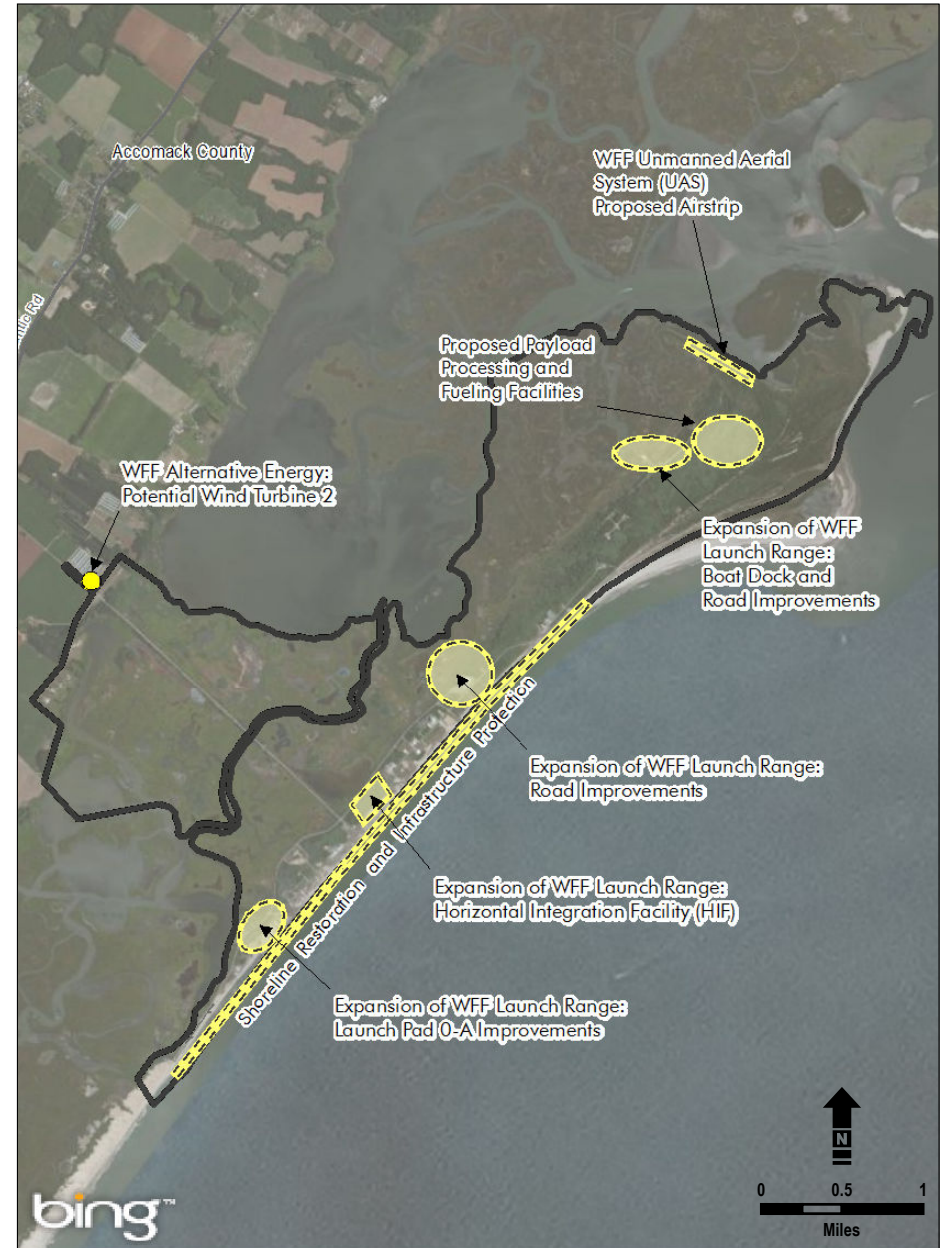


Figure 5-2
Other Projects On and Around
Wallops Flight Facility

- Projects - Wind Turbine
- Project Areas
- Wallops Flight Facility
- Active Runway
- Major Highway
- Local Street

and allow maintenance and would be installed in open, grassy areas or over parking lots. Power would be collected from the solar panels by underground transmission lines leading to a set of switchgear enclosed in a 320-square-foot pre-fabricated building. The installation period for the solar panels is expected to be approximately 2 months. One of the residential-scale wind turbines would be installed near the NASA Visitor Center, and the second would be installed near the security guard station at the entrance gate on the WFF Mainland parcel. No transformers or interconnection switchgear would be needed for the turbines (NASA 2011c).

Grand Bay Properties and Private Individuals' Construction of Residences at Olde Mill Pointe

The Residences at Olde Mill Pointe residential development consists of a total of 99 parcels, of which 55 are currently available for development. The parcels consist of 1- to 3-acre lots. Approximately half of the available lots have been sold, and the properties are being built out with single-family residences. These residences may be for year-round use or seasonal/occasional use. The residences will not be connected to public sewer or water service but will have their own private wells and septic systems (MLG Companies 2010).

North Wallops Island Unmanned Aerial Systems Airstrip Environmental Assessment

NASA is proposing to construct and operate an unmanned aerial systems (UAS) airstrip on the north end of Wallops Island. This airstrip would augment use of the existing UAS airstrip on Wallops Island, which has operational limitations. NASA is preparing an EA to analyze the environmental effects of the proposed action, which includes a 3,000-foot-long (of which 2,500 feet would be runway and 500 feet would be clear zone) and 75-foot-wide airstrip. Approximately 1,040 UAS operations (on average, four UAS sorties per day) would be conducted from the airstrip each year. UAS would continue to operate from the existing UAS airstrip (NASA 2012).

NASA Shoreline Restoration and Infrastructure Protection Program

NASA prepared a PEIS in 2010 to address a 50-year coastal storm damage reduction strategy at Wallops Island. The PEIS also covered construction of initial shoreline erosion protection measures on the island. These included extending Wallops Island's existing rock seawall 1,430 feet to the south and placing approximately 3.2 million cubic yards of fill on a 3.7-mile length of shoreline. Following initial fill of the beach, renourishment is planned to occur approximately every 5 years over the 50-year planning period. Each renourishment fill volume is expected to be approximately 616,000 cubic yards (NASA Wallops Flight Facility 2010). Because the impacts would be localized and focused at WFF Wallops Island and outside the area of ground disturbance at WFF Main Base, there would be no cumulative impacts with the Navy's proposed action. As a result, there is no cumulative impacts analysis for the shoreline restoration and infrastructure protection program.

5.2.1.2 Reasonably Foreseeable Projects

NASA Site-wide Programmatic Environmental Impact Statement

NASA is preparing a Site-wide PEIS to evaluate its proposal to support its growing mission base by providing facilities and infrastructure that would directly support existing missions as well as modernized functionality to meet future operational mission requirements. The PEIS will evaluate the two action alternatives and a No Action Alternative, summarized below:

- Alternative 1 would include construction, demolition, and renovation of facilities; enlargement of restricted airspace (R-6604); addition of two rocket launchers on Wallops Island; replacement of the Wallops causeway bridge; maintenance dredging between the boat docks at the Main Base and Wallops Island; and introduction or expansion of NASA programs at WFF.
- Alternative 2 would include all the activities under Alternative 1 and additional construction projects and missions, including introduction of commercial manned space flight from WFF.
- The No Action Alternative would have NASA and its partners continue existing operations and programs at WFF (NASA 2011d).

5.2.2 Cumulative Impact Analysis by Resource

The resources that may have the potential for a cumulative impact from the Navy's proposed action and other past, ongoing, or reasonably foreseeable future actions include aircraft operations and airspace, safety, air quality, noise, land use, visual landscape, and biological resources. The following resources are discussed in this EA but are not discussed in Section 5 because the Navy's proposed action would have either no impact or a negligible impact and no or negligible potential for a cumulative impact: land use; infrastructure and utilities; geology, topography, and soils; water resources; cultural resources; socioeconomic resources; and environmental management.

5.2.2.1 Aircraft Operations and Airspace

Under Alternative 2, no airspace designations would be permanently changed because the Navy's proposed action would be temporary, scheduled, and communicated to other operators in advance. Therefore, there would be no impacts to airspace and, thus, no cumulative impacts to airspace. The geographic study area evaluated for cumulative impacts to WFF Main Base aircraft operations is the airfield itself. The build-out of Wallops Research Park and the Site-wide PEIS at WFF have the potential to cumulatively impact aircraft operations in combination with the proposed action. The expansion of the WFF launch range and the construction of the UAS airstrip are outside of the geographic study area.

Navy Proposed E-2/C-2 FCLP Operations

Under Alternative 2, there would be a minor impact to existing operations and use of the airfield as the runway would be closed to non-FCLP arrivals and departures, except in the case of an emergency. However, impacts would not be

significant because the effect of the Navy's proposed action on existing operations would be temporary and would be communicated to operators in advance. The Navy would require 24-hour-per-day, seven-day-per-week, capability; however, the Navy would not use the airfield all day or every day. Training would generally be scheduled Monday through Friday in three-hour periods.

Other Projects

Build-out of the Wallops Research Park would result in an additional 15 air operations annually at the airfield. The Site-wide PEIS includes the introduction and expansion of NASA programs at WFF, which could result in additional air operations.

A maximum of 1,040 UAS operations would occur each year from the proposed UAS airstrip on northern Wallops Island. UAS operations from the airstrip would occur entirely within restricted airspace and the warning area over and offshore of Wallops Island (shown on Figure 3-4). There would be relatively few UAS operations per year compared to the proposed number of Navy FCLP operations. The airspace used for UAS operations would not overlap with the Navy's proposed holding pattern flight track; therefore, the proposed UAS airstrip would not result in cumulative impacts when considered with the Navy's proposed action (NASA 2011b).

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

There are 13,074 existing aircraft operations at WFF, to which the Navy's proposed action would add up to 45,000 aircraft operations, and the build-out of Wallops Research Park would include an additional 15 annual air operations. Although the introduction and expansion of NASA programs at WFF under the Site-wide PEIS could result in additional air operations, these air operations are not reasonably foreseeable at this time. The multiple runways at WFF Main Base are more than adequate to accommodate this amount of aircraft activity. Therefore, the Navy's proposed action combined with other pertinent past, ongoing, and reasonably foreseeable future actions would not be expected to generate significant cumulative impacts to aircraft operations at WFF.

5.2.2.2 Safety

The geographic study area evaluated for cumulative impacts to safety is the airfield property, the runway clear zones, and the runway potential accident zones at WFF Main Base. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact safety in connection with the proposed action are those that would increase the risk of an aviation mishap.

Navy Proposed E-2/C-2 FCLP Operations

During hours when the airfield is open, the air traffic control tower will monitor and direct non-FCLP participating aircraft, as necessary. The increase in air operations at WFF Main Base would result in a minor increase in the potential for a BASH incident to occur; however, this risk would be mitigated through

measures implemented under the WFF BASH Program and Wildlife Hazard Management Plan (see Section 3.3.4.3).

Other Projects

Build-out of the Wallops Research Park would result in an additional 15 air operations annually at WFF Main Base. The Site-wide PEIS includes the introduction and expansion of NASA programs at WFF, which could result in additional air operations. Increases in air operations under these two projects could increase the potential for aviation mishaps.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

BASH hazards at WFF Main Base would continue to be managed under the WFF BASH Program and Wildlife Hazard Management Plan. None of the projects identified in Section 5.2.1 that would occur at WFF Main Base would create new attractants for birds or wildlife. Continued implementation of standard air traffic management techniques at the airfield would minimize the risk of aviation mishaps between proposed operations and existing or new operations. Therefore, the Navy's proposed action combined with other pertinent past, ongoing, and reasonably foreseeable future actions would not be expected to generate significant cumulative impacts to safety at WFF Main Base.

5.2.2.3 Air Quality

The geographic study area evaluated for cumulative impacts to air quality includes Accomack County because air quality standards are tracked at the county level. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact air quality in connection with the proposed action are those that would generate air emissions either during construction, operation, or both, including build-out of the Wallops Research Park, facilities and infrastructure as analyzed in the Site-wide PEIS, and construction of residences at Olde Mill Pointe. Existing emissions sources in the county include transportation sources (vehicles and civilian, military, and other government aircraft), building use, industrial sources, food production, and power generation. Based on available information regarding future development, emissions from mobile and stationary sources in the county are expected to remain near their current levels. Accomack County is in attainment for all National Ambient Air Quality Standards or unclassified for all criteria pollutants.

Navy Proposed E-2/C-2 FCLP Operations

Accomack County is in attainment for all National Ambient Air Quality Standards. The county is rural, with minimal existing air emissions compared to the total emissions in the Commonwealth of Virginia (see Section 3.4.3). As discussed in Section 1.5.2, mobile and temporary source emissions are not subject to the Prevention of Significant Deterioration standards; however, the Prevention of Significant Deterioration thresholds provide a method to put the increases in mobile emissions in context as related to the National Ambient Air Quality Standards. Under Alternative 2, both temporary construction emissions and annual operating emissions are projected to be between less than 1 ton per year

and approximately 64 tons per year for all criteria pollutants and therefore would have no significant impact on air quality in the region.

Aircraft operations generate greenhouse gas emissions at the ground level and in transit from NS Norfolk Chambers Field.³ Alternative 2 would include temporary construction emissions and redistribution of existing aircraft operations. Ground-level emissions from construction and vehicles would be minimal, and these temporary emissions would not have long-term climate impacts. The total greenhouse gas emissions generated by FCLP operations currently represent an insignificant fraction of global greenhouse gas emissions, and relocating these operations to WFF Main Base would not produce a significant change in global climate change.

Other Projects

Accomack County is expected to stay largely rural over the operational period of the proposed action, and mobile and stationary-source emissions in the county are expected to remain minimal.

Existing activities at WFF that generate mobile-source air emissions include aircraft operations, rocket launches, construction, and vehicle operations; these activities are projected to continue over the operational period of Alternative 2. Proposed operational changes and construction projects on WFF Main Base as analyzed in NASA's PEIS, the WFF launch range, Wallops Research Park, and the Olde Mill Pointe residential development, could result in impacts to local air quality. Construction is expected to occur over multiple years. Projected mobile-source emissions data from construction equipment and privately owned vehicles are unavailable for these projects. However, construction-related emissions would be spread over the entire construction period.

Each of the identified construction projects would increase privately owned vehicle use in Accomack County. Over the projected 20-year build-out period, development of the Wallops Research Park is expected to result in an increase of 3 percent in Accomack County's population. This increase in population would generate an increase in emissions from privately owned vehicles in the county. The potential increase in population and, therefore, privately owned vehicle use resulting from expansion of activities at the WFF launch range and development of 99 residential parcels at Olde Mill Pointe would be substantially smaller. The operational changes on WFF Main Base that NASA is analyzing in its PEIS could have a larger impact on population and privately owned vehicle use in the county. These impacts are being captured in the PEIS, which is currently under development.

³ Federal agencies are required to address emissions of greenhouse gases with analysis and emission reduction planning by EO 13514 (*Federal Register* 2009) and the Energy Policy Act of 2005, and CEQ guidance has recommended the analysis of direct and indirect emissions from proposed actions to provide meaningful information to the decision-makers and the public (CEQ 2010). Energy (fuel) use also is considered, based on the recommendations of EO 13514.

Build-out of the Wallops Research Park is expected to increase aircraft operations at WFF Main Base by 15 operations annually (NASA 2008c). These annual aircraft operations would generate minimal air emissions.

Multiple airfields are located in Accomack County. These airfields are private or small regional airfields and are not expected to have large numbers of aircraft operations that would contribute significant air emissions. One existing and partially developed industrial park, the Accomack Airport Industrial Park, is located at the Accomack County Airport, near Melfa. No large-scale industrial development that could significantly increase mobile-source emissions is currently planned or proposed for the industrial park.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Under Alternative 2, both temporary construction emissions and annual operating emissions are projected to be between less than 1 ton per year and approximately 64 tons per year for all criteria pollutants and therefore would have no significant impact on air quality in the region.

Over the operational period of the proposed action, mobile-source air emissions would be generated by the increased air operations at WFF Main Base and increased privately owned vehicle use in Accomack County. Build-out of the Wallops Research Park and the construction and operational changes analyzed in NASA's PEIS are both large-scale projects and could have noticeable impacts on the county's population (and, indirectly, privately owned vehicle use). Therefore, Alternative 2 and the other projects in the study area could pose a moderate cumulative impact to air quality.

Alternative 2 and the other projects identified above would not significantly increase new emission sources subject to evaluation under the Mandatory Greenhouse Gas Reporting Rule (see Section 3.4 for a description of this regulation).

Greenhouse gas emissions are by nature global and cumulative, as individual sources of greenhouse gas emissions are not large enough to have an appreciable effect on climate change. A significant impact on global climate change could only occur when the greenhouse gas emissions of a proposed action combine with greenhouse gas emissions from other man-made activities on a global scale. Even when considering the projects together, no global-scale changes to greenhouse gas emissions would occur.

5.2.2.4 Noise

The geographic study area evaluated for cumulative impacts to the noise environment is the area within the greater than 65 dB DNL noise zone associated with Navy FCLP operations (see Figures 3-14 and 3-15). Multiple construction projects are planned at WFF Main Base and the Wallops Research Park. Additionally, residential construction is expected to occur at Olde Mill Pointe, located northwest of the airfield.

Navy Proposed E-2/C-2 FCLP Operations

The increase in land area falling under the greater than 65 dB DNL noise zone at WFF Main Base due to the proposed Navy E-2/C-2 operations (up to 45,000 annual aircraft operations) would equate to approximately 208.7 and 155.1 acres for Scenarios 1 and 2, respectively. Under Alternative 2, Scenario 1, an estimated 268 more individuals, or approximately 0.8 percent of the total county population, would be within the greater than 65 dB DNL noise zone. Of that total, 83 more individuals (0.3 percent of the total county population) would be within the greater than 70 dB DNL noise zone compared to existing conditions. Under Alternative 2, Scenario 2, an estimated 173 more individuals, or approximately 0.5 percent of the total county population, would be within the greater than 65 dB DNL noise zone. Of that total, 14 more individuals (or 0.04 percent of the total county population) would be within the greater than 70 dB DNL noise zone compared to existing conditions. All of the identified points of interest currently experience higher maximum modeled SEL values than they would experience if Alternative 2 were implemented at WFF Main Base. Noise impact would not be significant because there would only be a slight increase in average noise expected at WFF Main Base under the Navy's proposed action. Furthermore, the Navy's proposed FCLP operations would be temporary and intermittent in nature. They would be conducted primarily during daytime hours and include three-hour blocks of aircraft operations, followed by periods of minimal or no aircraft activity.

Other Projects

Construction projects at WFF Main Base, the Wallops Research Park, and Olde Mill Pointe would result in a temporary increase in noise, generated primarily from operation of light and heavy construction equipment and project-related vehicle traffic. Both types of noise would occur near the proposed project location during daylight working hours and would typically be intermittent. Additionally, build-out of the Wallops Research Park would result in an additional 15 aircraft operations per year from the airfield at WFF Main Base. Compared to the existing 13,074 aircraft operations and the Navy's proposed 45,000 aircraft operations at WFF Main Base, the addition of 15 aircraft operations would be negligible. Therefore, this relatively small number of projected aircraft operations would not be expected to increase the size of the noise contours associated with the airfield or contribute significantly to noise impacts from air operations at WFF Main Base.

Current launch operations and projected Antares launch operations at Launch Complex 0 on Wallops Island also would have cumulative impacts to the noise environment with Alternative 2. NASA's current NEPA documentation covers up to 12 orbital-class rocket launches, 60 sounding rockets, and 30 Navy missile and drone launches per year. Since 2001, NASA has launched an average of six sounding rockets and one orbital launch vehicle from the launch complex each year. Although the noise generated by launching an orbital launch vehicle (the largest vehicles launched) may be audible from areas around the Main Base, NASA's 2009 EA for the expansion of the WFF launch range states that "noise levels from rocket launches attenuate rapidly, are low frequency, and occur infrequently" (NASA 2009b). Sounding rockets are relatively small, and their

launches generate less noise, which tends to dissipate within one minute (NASA 2000).

Antares operations at WFF are projected to occur no more than eight times per year and consist of approximately six launches and two static fire tests (during which the Antares would not be launched). During an Antares launch or static fire test, noise levels of up to 107 dB may be experienced on the southern part of the WFF Main Base property and surrounding areas of Accomack County to the south that are within 6.6 miles of the launch pad. These noise levels “would be maintained for only 30 to 60 seconds during launches and for up to 52 seconds during static fire testing and would attenuate after 1 to 2 seconds” (NASA 2009b). Therefore, noise generated by launches or static fire tests would be infrequent and of short duration. A water deluge system would be used at the launch pad to reduce engine noise during launches and would mitigate in part the noise levels experienced in areas surrounding Wallops Island (NASA 2009b).

Construction of the UAS airstrip on Wallops Island also would result in a temporary increase in noise near the proposed project location. In the EA, NASA determined that the maximum DNL for the UAS flight track near the airstrip would be 43 dB DNL on an average day, with a total of eight UAS flight operations (NASA 2011b). NASA did not model noise contours for operations at the proposed UAS airstrip because the small number of operations would not significantly increase noise levels over existing conditions. UAS operations flown from the airstrip would operate in the restricted airspace and warning area over and offshore of Wallops Island. Because of the distance between Wallops Island and the Main Base, construction of the UAS airstrip and UAS operations would not be expected to generate cumulative impacts to noise with the Navy’s proposed action.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Construction projects at WFF Main Base, the Wallops Research Park, and Olde Mill Pointe would occur during the construction phase of infrastructure needed to support the Navy’s proposed FCLP at WFF Main Base as well as during the operational phase. Because of the number of construction projects planned on and around WFF Main Base, construction noise is likely to be present in the area for multiple years. Because construction would occur only during daylight hours, construction would overlap with FCLP operations only during daytime training periods. Noise from construction typically would be intermittent because construction equipment would not be operating constantly and may not be noticeable over ambient background noise levels from normal industrial operations at WFF Main Base. Construction-related noise on Wallops Island would be expected to attenuate within a relatively short distance from the construction site. When construction and FCLP operations would be occurring simultaneously, FCLP operations would likely mask any noise generated by construction projects.

Of the operational changes noted above, existing and proposed launches and static fire tests would be the most likely to generate cumulative impacts with the Navy’s

proposed action. Both existing and proposed launches and static fire tests are unlikely to occur simultaneously with FCLP operations; however, when and if a launch or static fire test does occur simultaneously with FCLP operations, the noise generated by these events would be of short duration. Based on the above, cumulative impacts to noise over the term of the proposed action would result from construction occurring on WFF and Wallops Research Park and existing and planned launch operations, but these cumulative impacts would not be significant.

5.2.2.5 Land Use

The geographic study area evaluated for cumulative impacts to land use at WFF Main Base is the area within the modeled 65 dB DNL and greater noise zone. The past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact noise along with the proposed action are those that would increase the acreage of land uses not considered compatible with high noise zones (i.e., residential land uses) within the study area.

Navy Proposed E-2/C-2 FCLP Operations

Alternative 2 would not have direct impacts to land use. The increase in the acreage of residential land uses in the modeled noise zones under Alternative 2 would be 27.6 acres under Scenario 1 and 21.9 acres under Scenario 2. Under existing conditions, the modeled 65 dB DNL and greater noise zone covers approximately 599.8 acres, of which 125.7 acres, or 21.0 percent of the zone, are considered residential lands. Under projected conditions, residential land uses would comprise a total of 19.0 percent (Scenario 1) and 19.6 percent (Scenario 2) of the area within the noise zones.

Other Projects

None of the other projects identified in Section 5.2.1 would increase the acreage of incompatible land uses in the modeled noise zones. Build-out of the Wallops Research Park would result in an additional 15 aircraft operations per year from the airfield at WFF Main Base, which would be negligible. This number of projected aircraft operations would not be expected to increase the size of the noise contours associated with the airfield and, therefore, would not increase the acreage of incompatible land uses in the modeled noise zones.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Because no other projects would increase the acreage of incompatible land uses in the modeled noise zones, there would be no cumulative impacts with the proposed action to land use.

5.2.2.6 Visual Landscape

The geographic study area evaluated for cumulative impacts to the visual landscape at WFF Main Base is anywhere within the viewshed of the airfield property. The build-out of Wallops Research Park, WFF Alternative Energy Project, construction of residences at Olde Mill Pointe, and the Site-wide PEIS for the Provision of Facilities and Infrastructure at WFF have the potential to cumulatively impact the visual landscape in combination with the proposed action.

Navy Proposed E-2/C-2 FCLP Operations

Airfield-associated modifications under Alternative 2 would be consistent with the visual setting of WFF Main Base. Although there would be an increase in the total number of aircraft operations at WFF Main Base under Alternative 2, the Navy conducting temporary, intermittent FCLP with E-2/C-2 aircraft would not be a significant impact.

Other Projects

The build-out of Wallops Research Park, the WFF Alternative Energy Project, and the Site-wide PEIS for the Provision of Facilities and Infrastructure at WFF would all be consistent with the visual setting of WFF Main Base as a NASA research facility and airfield. The construction of single-family residences at Olde Mill Pointe would be consistent with the rural residential setting of the surrounding area.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The Navy's action, the build-out of Wallops Research Park, the WFF Alternative Energy Project, the construction of residences at Olde Mill Pointe, and the Site-wide PEIS for the Provision of Facilities and Infrastructure at WFF would all be consistent with the visual landscape of WFF Main Base and the surrounding area. WFF Main Base is an active airfield used by E-2/C-2 aircraft and other military and commercial aircraft, so the communities surrounding the airfield generally are accustomed to seeing aircraft operations. Therefore, there would be no significant cumulative impacts to the visual landscape under Alternative 2.

5.2.2.7 Biological Resources

The geographic study area evaluated for cumulative impacts to biological resources, including wildlife, marine mammals, avian resources, federally threatened and endangered species, and state threatened and endangered species, is the area within WFF Main Base's modeled 65 dB DNL noise contours under Alternative 2. Past, present, or reasonably foreseeable actions in the study area that have the potential to cumulatively impact biological resources along with the proposed action are the build-out of the Wallops Research Park, the expansion of the WFF launch range, the Residences at Olde Mill Pointe, the Alternative Energy Project, and facilities and infrastructure as analyzed in the Site-wide PEIS.

Navy Proposed E-2/C-2 FCLP Operations

Construction could directly result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Non-avian and avian wildlife would be impacted by loss of habitat resulting from construction and noise resulting from air operations. These impacts would not be expected to be significant. As no construction activities would take place in Chincoteague Bay or impact the bay in any way, there would be no significant impacts to marine mammals from construction activities under Alternative 2. Transmission of noise from aircraft into the water would be possible; however, animals would have to be at or near the surface at the time of an overflight to be exposed to elevated sound

levels. Considering the existing aircraft overflights in the study area, potential impacts would be expected to be minimal from the increase in aircraft operations at WFF Main Base associated with Alternative 2. Additionally, the Navy's proposed action under Alternative 2 would be temporary and intermittent in nature. Therefore, the Navy has determined that although short-term disturbance of the bottlenose dolphin from the increase in aircraft operations at WFF Main Base could be possible, Alternative 2 would not result in Level A or Level B harassment as defined under the Marine Mammal Protection Act, and there would be no significant impact to the bottlenose dolphin.

Any marine fish that occur regularly in Chincoteague Bay are already habituated to noise from current and ongoing aircraft overflights, and the projected noise contours under Alternative 2 are only slightly larger than the existing noise contours at WFF Main Base. Therefore, there would be no significant impact to fish species present in Chincoteague Bay from the increase in aircraft operations at WFF Main Base associated with Alternative 2.

There is no suitable nesting habitat for sea turtles at WFF Main Base, either within the areas of proposed construction or within the 65 dB DNL or greater noise contour; therefore, there would be no effect from aircraft overflights on nesting sea turtles under Alternative 2. As no construction activities associated with Alternative 2 would occur in Chincoteague Bay or indirectly impact the bay, there would be no impacts to the loggerhead, Kemp's ridley, and green sea turtles and the Atlantic and shortnose sturgeon, blueback herring, or scalloped hammerhead shark from construction under Alternative 2.

Given the current air operations at WFF Main Base, bald eagles nesting close to the facility are likely habituated to aircraft activity and noise. Therefore, an increase in air operations at WFF Main Base under Alternative 2 would not be expected to result in a take of bald eagles. Because there would be no direct impacts to bald eagles under Alternative 2, a non-purposeful take permit (50 CFR 22.26) under the Bald and Golden Eagle Protection Act would not be required. Therefore, there would be no significant impact on the bald eagle.

Gull-billed terns do not occur on WFF Main Base and therefore would not be impacted by construction under Alternative 2. Additionally, no significant increase in aircraft noise would be expected on the barrier islands where gull-billed terns are likely to occur. Consequently, Alternative 2 would have no effect and therefore no significant impact on the state-threatened gull-billed tern.

Other Projects

Build-out of Wallops Research Park, expansion of the launch range, the facilities and infrastructure analyzed in the Site-wide PEIS, the WFF Alternative Energy project, and construction of residences at Olde Mill Pointe would have impacts on non-avian and avian wildlife. Construction could result in both direct and indirect minor impacts on individual animals, such as small mammals, reptiles, and amphibians that are likely abundant on the airfield and surrounding areas. Non-avian and avian wildlife would be impacted by loss of habitat and temporary noise impacts during construction. These impacts would be minor. The same

projects, excluding the WFF Alternative Energy project and construction of residences at Olde Mill Pointe, may potentially create long-term, minor impacts as a result of increased noise. Construction impacts would be temporary and minor in nature. WFF has been operational since the 1940s, and projected operations under the identified projects would be similar to operations currently conducted. Wildlife species would be expected to habituate to increased noise levels at WFF Main Base and Wallops Island after short-term effects. Impacts to marine mammals and fish would not be expected to be significant.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The Navy's proposed action, the build-out of the Wallops Research Park, the expansion of the WFF launch range, the Residences at Olde Mill Pointe, the Alternative Energy Project, and the facilities and infrastructure as analyzed in the Site-wide PEIS would result in a cumulative impact on non-avian and avian wildlife from construction; however, the impact would not be expected to be significant because similar habitats are abundant in the surrounding area. The Navy's proposed action, the build-out of the Wallops Research Park, the expansion of the WFF launch range, and the facilities and infrastructure as analyzed in the Site-wide PEIS could result in a cumulative impact on non-avian wildlife, including fish, avian wildlife, and marine mammals from increased noise; however, the impact would not be expected to be significant as most wildlife occurring in the area are already likely habituated to noise levels from current operations. Individual animals not currently habituated to increased noise would likely habituate following short-term effects. The Navy's proposed action under Alternative 2 would have no effect on federally listed threatened and endangered species or impacts on state-listed threatened and endangered species; therefore, there would be no cumulative impacts associated with these resources.

6

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