Final

Environmental Assessment for Replacement of EA-6B Aircraft with EA-18G Aircraft at Naval Air Station Whidbey Island, Washington

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Final Environmental Assessment for Replacement of EA-6B Aircraft with EA-18G Aircraft at Naval Air Station Whidbey Island, Washington

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Abstract: This Environmental Assessment (EA) presents the environmental consequences of the Department of the Navy's Proposed Action to replace the EA-6B aircraft with the EA18G aircraft at Naval Air Station (NAS) Whidbey Island, Washington, and to provide facilities and functions to support this replacement. Environmental consequences are associated with changes to aircraft operation, personnel transitions, and new construction or renovation of structures at NAS Whidbey Island.

The primary types of Airborne Electronic Attack (AEA) mission training and readiness requirements for the EA-18G will remain virtually the same as those for the EA-6B currently stationed at NAS Whidbey Island. However, the airframe, aircraft components, and aircraft performance of the EA-18G will differ from those of the EA-6B. Existing facilities and functions at NAS Whidbey Island will need to be modified to accommodate the replacement airframe. In addition, replacement of the EA-6B squadrons with the EA-18G squadrons will result in a decrease in the number of aircraft and personnel associated with the AEA squadrons and a reduction in flight training operations at NAS Whidbey Island.

Alternatives considered for the Proposed Action include use of existing facilities with minor internal modifications, construction of an additional hangar facility, and no-action. The Navy's preferred alternative is to use existing facilities with minor internal modifications.

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List of Acronyms and Abbreviations

AEA	Airborne Electronic Attack
AESA	Active Electronically Scanned Array
AESO	Aircraft Environmental Support Office
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
AIMD	Aircraft Intermediate Maintenance Detachment
AMRAAM	Advanced Medium-Range, Air-to-Air Missile
APZs	Accident Potential Zones
AUL	Authorized Use List
BASH	Bird Aircraft Strike Hazard
BMP	Best Management Practices
CAA	Clean Air Act
CALA	Combat Aircraft Loading Area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHRIMP	Consolidated Hazardous Material Reutilization and Inventory Management Program
CO	Carbon Monoxide
CPRW	Commander Patrol and Reconnaissance Wing
CVW	Carrier Air Wing
CVWP	Commander, Electronic Attack Wing Pacific
CWA	Clean Water Act
CY	Calendar Year
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	Decibel

dBA	A-weighted decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EAWS	Electronic Attack Warfare School
ECMO	Electronic Countermeasures Officer
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESOH	Environment, Safety, and Occupational Health
ESQD	Explosive Safety Quantity Distance
FCLP	Field Carrier Landing Practice
FRS	Fleet Replacement Squadron
FY	Fiscal Year
GCA	Ground-Controlled Approach
GSE	Ground Support Equipment
HARM	High Speed Anti-Radiation Missiles
HC	Hydrocarbon
HSMS	Hazardous Substance Management System
HVAC	Heating, Ventilation, Air Conditioning
ICAP III	Improved Capability III
IFLOLS	Improved Fresnel Lens Optical Landing System
INRMP	Integrated Natural Resources Management Plan
LSO	Landing Signals Officer
LTO	Landing and Take-off Operation

MOA	Military Operations Area
MSGP	Multi-Sector General Permit
MSL	Mean Sea Level
MTR	Military Training Route
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NASWHIDBEYINST	NAS Whidbey Instruction
NATTU	Naval Aviation Technical Training Unit
NEPA	National Environmental Policy Act
NM	Nautical Mile
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOX	Nitrogen Oxides
NRHP	National Register of Historic Places
NWAPA	Northwest Air Pollution Authority
NWSTF	Naval Weapons Systems Training Facility
OLF	Outlying Field
OPAREA	Operating Area
ORMA	Ocean Resource Management Act
PESHE	Programmatic Environment, Safety, and Occupational Health Evaluation
PM	Particulate Matter
PMSA	Primary Metropolitan Statistical Area
POV	Personally Owned Vehicle
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RFI	Radio Frequency Interference
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer

SMA	Shoreline Management Act
SO2	Sulfur Dioxide
SUA	Special Use Airspace
SWPPP	Stormwater Pollution Prevention Plan
TJS	Tactical Jamming Systems
TSDF	Treatment, Storage, and Disposal Facility
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
VAQ	Electronic Attack Squadron (Navy and Expeditionary)
VOC	Volatile Organic Compounds
VP	Maritime Patrol Squadron
VQ	Reconnaissance Squadron
W	Warning Area
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources

Executive Summary

Type of Report

This Environmental Assessment (EA) presents the potential environmental consequences of the Navy's Proposed Action to replace the EA-6B aircraft with the EA18G aircraft at Naval Air Station (NAS) Whidbey Island, Washington, and to provide facilities and functions to support this replacement. These environmental consequences are associated with changes in aircraft operation, personnel transitions, and new construction or renovation of structures at NAS Whidbey Island, as necessary.

Description of the Proposed Action

For more than 30 years, the EA-6B aircraft has been in the fleet conducting the Airborne Electronic Attack (AEA) mission. Although the airframe has remained operationally viable through systematic upgrades, it is approaching the end of its service life. The EA-18G, a variant of the F/A-18 F "Super Hornet" strike-fighter aircraft, will be equipped with the same electronic weapons systems as the EA-6B, which will allow it to perform the AEA mission currently performed by the EA-6B community. Given the similarities between the EA-6B and EA-18G, the primary types of mission training and readiness requirements will be nearly identical. By combining two proven systems (i.e., the F/A-18 F airframe and the EA-6B electronic weapons systems), the Navy's required AEA capability will be maintained with the Navy's designated replacement airframe.

The EA-6B community of personnel, equipment, and mission-related functions has been performing the AEA mission at NAS Whidbey Island since 1971. Consequently, NAS Whidbey Island and the surrounding area meet all of the necessary requirements of the AEA mission. Since all the requirements of the new airframe can be met at an existing AEA homebase, the Department of the Navy is proposing to provide facilities and functions to support the replacement of the EA-6B with the EA-18G at NAS Whidbey Island.

NAS Whidbey Island is located in Island County, Washington, approximately 80 miles north of Seattle, Washington, on Whidbey Island in Puget Sound. Ault Field is the primary operational facility for NAS Whidbey Island and the location of the central airfield. Outlying Field (OLF)

Coupeville, located 10 miles southeast of Ault Field, is used primarily for Field Carrier Landing Practice (FCLP) operations.

Replacement of the EA-6B with the EA-18G will begin in 2008 and be completed in 2013. The replacement process will result in an overall decrease in the number of Electronic Attack (VAQ) aircraft and associated personnel stationed at NAS Whidbey Island. A total of 57 EA-18G aircraft will replace the existing 72 EA-6B aircraft, resulting in a decrease of 15 VAQ aircraft stationed at NAS Whidbey Island and a decrease of approximately 1,106 personnel associated with the AEA aircraft squadrons.

There will be no change in the training syllabus that would cause changes to the types of flight operations flown by the EA-6B (arrivals, departures, pattern operations), the locations of flight operations (flight tracks over land or water), or the current ratio of daytime and nighttime flight operations at Ault Field or OLF Coupeville. In addition, there will be no change to the number or type of flight operations within national airspace, designated SUA, and in the low-altitude MTRs from what has been conducted by the EA-6B squadrons for several decades.

Description of Alternatives

In general, the functions and facilities needed to support the EA-18G aircraft are very similar to existing facilities and functions supporting the EA-6B aircraft.

Alternative 1. The Navy's preferred alternative is to provide minor modifications to the existing facilities at NAS Whidbey Island to accommodate the EA-18G aircraft squadrons. Internal modifications to existing facilities would be necessary for the aircraft simulators, engine test cell, Naval Aviation Technical Training Unit (NATTU), and Aircraft Intermediate Maintenance Department (AIMD). These modifications include minor changes to room configuration; electrical power routing; heating, ventilation, air conditioning (HVAC); mountings for replacement equipment; etc.

Alternative 2. Similar to the preferred alternative (Alternative 1), internal modifications to existing facilities would still be completed for the simulators, engine test cell, NATTU, and AIMD, and would include minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc.

In addition, an estimated 20,000-square-foot hangar addition would be constructed adjacent to Hangar 10 to provide improved flexibility in meeting aircraft storage and maintenance requirements. This modification would be constructed consistent with existing on-station land use, land already developed with tarmac and connected to existing service utilities.

Summary of Environmental Impacts

Replacement of the EA-6B with the EA-18G would have a positive impact on the noise environment under both Alternative 1 and Alternative 2. The day-night average sound level (DNL) noise metric was used to evaluate the change in the existing (calendar year [CY] 2003) and projected (CY 2013) noise environment, with a greater than 65-dB DNL noise contour considered high noise exposure. Implementation of the Proposed Action would result in a 36% reduction in the population exposed to aircraft noise greater than 65 dB DNL around Ault Field, and a 16% reduction in the population exposed to aircraft noise greater than 65 dB DNL around OLF Coupeville. Similarly, implementation of the Proposed Action would result in a 28% decrease in the land area and a 38% reduction in the number of housing units within the greater than 65-dB DNL noise contour around Ault Field. Implementation of the Proposed Action would result in a 9% decrease in the land area and a 16% reduction in the number of housing units within the greater than 65-dB DNL noise contour around OLF Coupeville.

Replacement of the EA-6B with the EA-18G would have no significant impact on regional air quality under either Alternative 1 or Alternative 2. Annual mobile source emissions of carbon monoxide (CO), nitrogen dioxide (NO_2), and volatile organic compounds (VOCs) are projected to increase with replacement of the EA-6B with the EA-18G. Annual mobile source emissions of particulate matter (PM_{10}) and sulfur dioxide (SO_2) are projected to decrease. Increases in CO, NO_2, and VOCs are not considered to be a significant impact on regional air quality, because they represent less than 1% of the total annual mobile source emissions within the three-county Northwest Air Pollution Authority (NWAPA) region. The NWAPA region is in attainment for all criteria pollutants, and the increase would not cause the region to be in violation of any of the National Ambient Air Quality Standards (NAAQS).

Stationary source emissions of CO from the test cell are projected to increase and emissions of VOCs, NO_X, SO_2, and PM_{10} are projected to decrease under both Alternative 1 and Alternative 2. Increased emissions of CO are not considered to be a significant impact on

regional air quality, as the projected increases are well below the Prevention of Significant Deterioration threshold as defined under the Clean Air Act.

Replacement of the EA-6B squadrons with EA-18G squadrons would result in a reduction of 1,106 personnel under both Alternative 1 and Alternative 2. This reduction would impact the on-station and regional population in Island County, if the personnel are reassigned outside of the local area. However, as the reduction in personnel would occur over a 6-year period, the annual reduction in personnel would range from 1% to 4% of the on-station population in CY 2003. The total reduction in personnel would represent a loss of only 3% of the Island County population in 2000. Considering that the reduction would occur over a 6-year period, that the population of Island County is projected to continue its growth trend, that the military personnel would be reassigned to other Naval installations, and that the number of civilian personnel would not be reduced, neither the economy, population, schools, or housing within Island County or its municipalities would be significantly affected.

Minor modifications to existing facilities under Alternative 1 and Alternative 2 would result in no significant impact on the natural or socioeconomic environment. Construction of a hangar addition under Alternative 2 would result in no significant impact on the natural or socioeconomic environment.

Cumulative Impacts

Implementation of any of the proposed projects in the Airfield Recapitalization Plan could have cumulative impacts on existing air quality under Alternative 1 and Alternative 2. However, the potentially cumulative increase in emissions would be minor and limited to the duration of the construction period.

Significant Impacts and Areas of Controversy

No significant impacts or areas of controversy were identified.

1 Purpose and Need

1.1 Introduction

For more than 30 years, the EA-6B aircraft has been in the fleet conducting the AEA mission. Although the airframe has remained operationally viable through systematic upgrades, it is approaching the end of its service life. The EA-18G, a variant of the F/A-18 F "Super Hornet" strike-fighter aircraft, will be equipped with the same electronic weapons systems as the EA-6B, which will allow it to perform the AEA mission currently performed by the EA-6B community. Given the similarities between the EA-6B and EA-18G, the primary types of mission training and readiness requirements will be nearly identical. By combining two proven systems (i.e., the F/A-18 F airframe and the EA-6B electronic weapons systems), the Navy's required AEA capability will be maintained with the Navy's designated replacement airframe.

This Environmental Assessment (EA) presents the potential environmental consequences of the Navy's Proposed Action to replace the EA-6B aircraft with the EA18G aircraft at Naval Air Station (NAS) Whidbey Island, Washington, and to provide facilities and functions to support this replacement. These environmental consequences are associated with changes in aircraft operation, personnel transitions, and new construction or renovation of structures at NAS Whidbey Island, as necessary.

1.2 Background

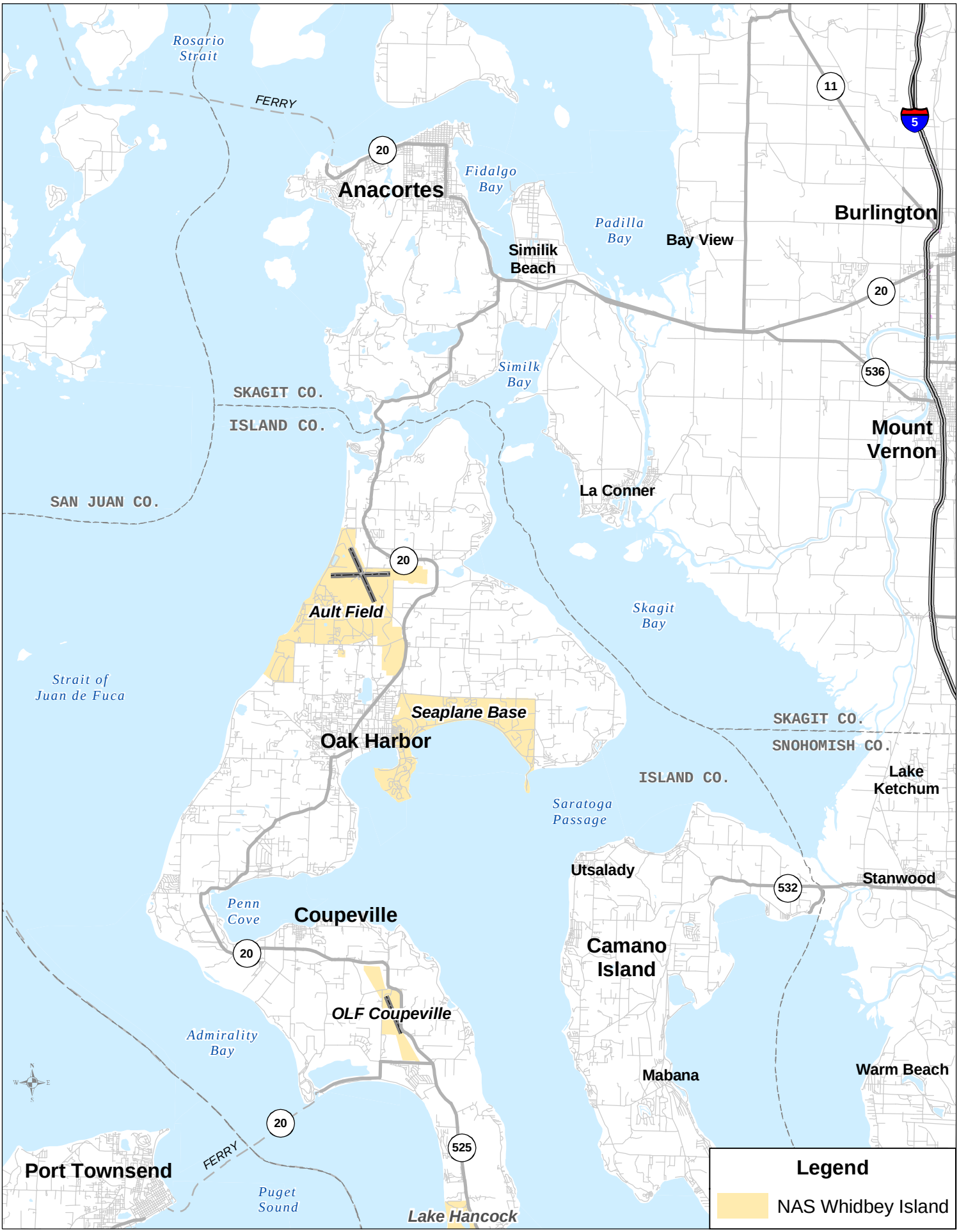
NAS Whidbey Island is located in Island County, Washington, approximately 80 miles north of Seattle, Washington, on Whidbey Island in Puget Sound (Figure 1-1). Ault Field is the primary operational facility for NAS Whidbey Island and the location of the central airfield. NAS Whidbey Island encompasses four other land units, including Outlying Field (OLF) Coupeville, Seaplane Base, and Lake Hancock, which are located in Island County. NAS Whidbey Island also administers Naval Weapons Systems Training Facility (NWSTF) Boardman, which is located in northern Oregon. NAS Whidbey Island provides land-based support and training (including airspace, operating areas and ranges) for all of the Navy's active-duty EA-6B aircraft squadrons, and the Pacific Fleet P-3C and EP-3 patrol and reconnaissance aircraft squadrons. The station also supports a Navy Reserve P-3C and C-9 squadron in addition

to the air station's UH-3H search-and-rescue helicopters. The station's two C-12 aircraft were divested in May 2004.

Airfield operations are conducted at Ault Field and OLF Coupeville. As the primary airfield, flight operations at Ault Field include arrivals, departures, and pattern (e.g., Field Carrier Landing Practice [FCLP]) operations. OLF Coupeville, located 10 miles southeast of Ault Field, is used primarily for FCLP operations. Aircraft squadrons stationed at NAS Whidbey Island train in the national airspace, in designated Special Use Airspace (SUA), and in low-altitude military training routes (MTRs) located within the Pacific Northwest Range and Operating Area Complex, as well as at training ranges and in SUA scheduled and/or controlled by other military agencies (e.g., Nanoose Range in Canada, Saylor Creek Range in Idaho, and Fallon Ranges in Nevada) (Figure 1-2).

In 2003, 14 squadrons of EA-6B aircraft were stationed at NAS Whidbey Island, including nine carrier air wing (CVW) squadrons, four expeditionary squadrons, and one fleet replacement squadron (FRS). (One expeditionary squadron has since been disestablished.) CVW squadrons deploy in carrier air wings aboard aircraft carriers. Their primary mission is AEA, which includes electronic surveillance and electronic attack (e.g., use of jamming equipment and High Speed Anti-Radiation Missiles [HARM]) against hostile radar and communication systems. The expeditionary squadrons also conduct AEA but deploy to land bases as directed by the Joint Staff to support Regional Combatant Commander requirements, United States Air Force (USAF) expeditionary wings, and United States Marine Corps (USMC) expeditionary forces. The FRS trains replacement aircrews for all Department of Defense (DoD) EA-6B squadrons at NAS Whidbey Island.

The EA-6B is equipped with sophisticated electronic weapons systems capable of receiving, disrupting, and destroying enemy radar and communications air defense systems. The ALQ-99 Tactical Jamming System includes receivers, displays, jamming pods, and the USQ-113 communications jamming system. An upgrade to the EA-6B weapon system, known as Improved Capability III (ICAP III), is in the Operational Evaluation phase of development and will enter service in 2005. The ALQ-218 receiver system is the cornerstone of ICAP III and will be adapted and incorporated into the EA-18G electronic weapons systems. In addition, the EA-18G will have a self-defense air-to-air capability with the Active Electronically Scanned Array (AESA) radar and AIM-120 Advanced Medium-Range, Air-to-Air Missile (AMRAAM).



Source: ESRI 2003

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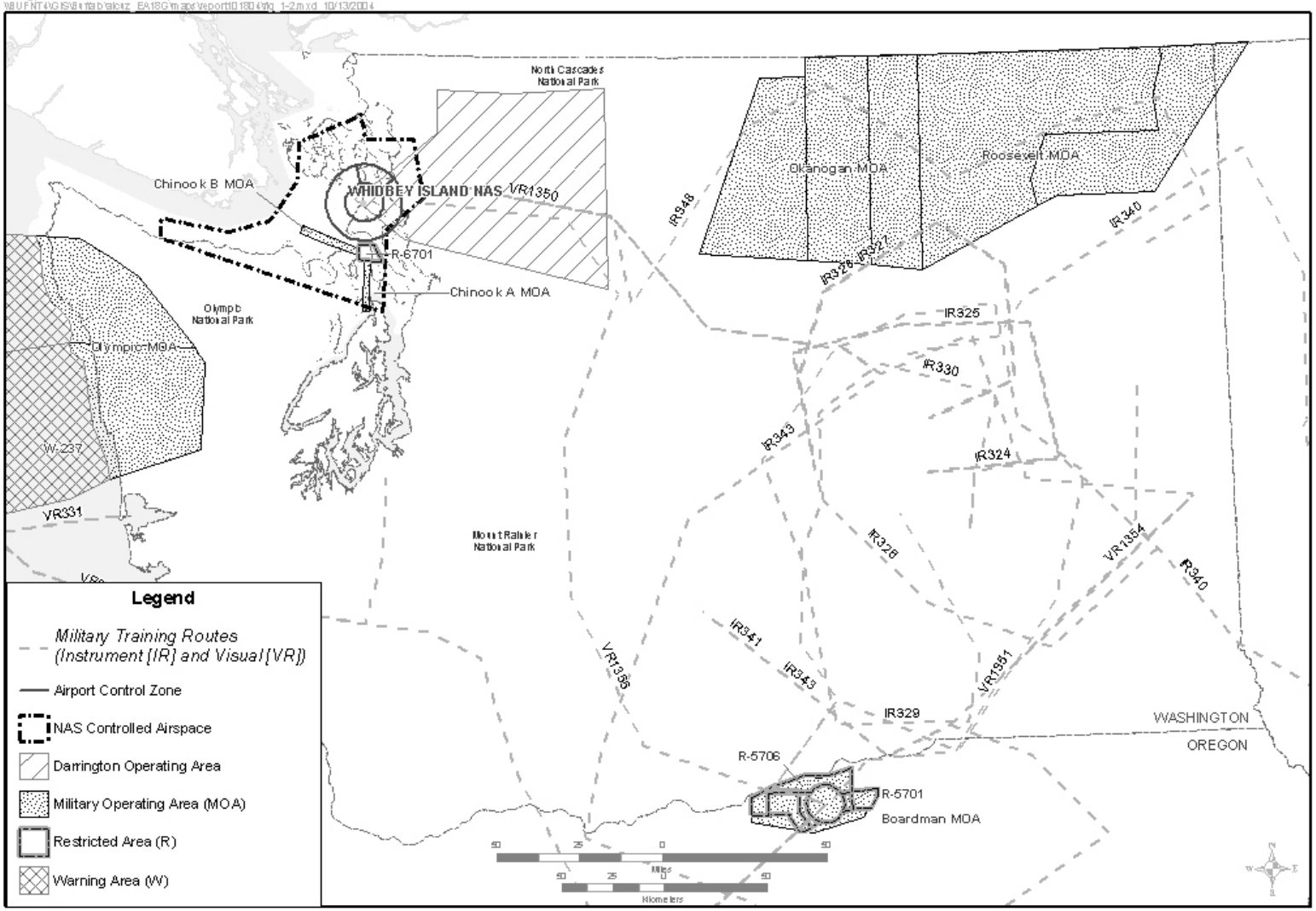
Figure 1-1 NAS Whidbey Island Regional Location Map



Source: National Imagery and Mapping Agency, Effective 18 March 2004 to 14 April 2004

Figure 1-2 Controlled Airspace And Training Areas NAS Whidbey Island

Replacement of the EA-6B with the EA-18G will begin in 2008 and be completed in 2013. The replacement process will result in an overall decrease in the number of Electronic Attack (VAQ) aircraft and associated personnel stationed at NAS Whidbey Island. A total of 57 EA-18G aircraft will replace the existing 72 EA-6B aircraft, resulting in a decrease of 15 VAQ aircraft stationed at NAS Whidbey Island and a decrease of approximately 1,106 personnel associated with the AEA aircraft squadrons (Tables 1-1 and 1-2).

Table 1-1 Aircraft and Squadron Changes for the Replacement EA-18G Aircraft at NAS Whidbey Island

EA-6B Squadrons		EA-18G Squadrons		
Number of Squadrons	Number of Aircraft	Number of Squadrons	Number of Aircraft	Net Change[1] in Aircraft
9 CVW Squadrons	36	9 CVW Squadrons	45	9
1 FRS	20	1 FRS	12	(8)
4 Expeditionary Squadrons	16	0 Expeditionary Squadrons	0	(16)
Total	**72**	**Total**	**57**	**(15)**

[1] Numbers in parentheses denote a decrease.

Table 1-2 Personnel Changes for the Replacement EA-18G Aircraft at NAS Whidbey Island

EA-6B Squadrons		EA-18G Squadrons		
Number of Squadrons	Number of Personnel	Number of Squadrons	Number of Personnel	Net Change[1] in Personnel
Officers				
9 CVW Squadrons[2]	252	9 CVW Squadrons[3]	189	
1 FRS Squadron	79	1 FRS Squadron	66	
4 Expeditionary Squadrons[2]	112	0 Expeditionary Squadrons	0	
Total	**443**	**Total**	**255**	**(188)**
Enlisted				
9 CVW Squadrons[2]	1,640	9 CVW Squadrons[3]	1,449	
1 FRS Squadron	424	1 FRS Squadron	353	
4 Expeditionary Squadrons	656	0 Expeditionary Squadrons	0	
Total	**2,720**	**Total**	**1,802**	**(918)**
Total Personnel	**3,163**	**Total Personnel**	**2,057**	**(1,106)**

[1] Numbers in parentheses denote a decrease.
[2] 28 officers, 164 enlisted per squadron (Madsen 2004).
[3] 21 officers, 161 enlisted per squadron (U.S. Department of the Navy 2003b).

Nine EA-18G CVW squadrons will replace the nine EA-6B CVW squadrons at NAS Whidbey Island, with one additional EA-18G aircraft per squadron. Although the number of aircraft in each CVW squadron will increase with replacement of the EA-6B with the EA-18G, the total number of personnel will decrease. Each EA-18G squadron will consist of nine two-member crews, replacing six four-member crews in each EA-6B squadron (U.S. Department of the Navy 2003b).

The Navy will disestablish the remaining three EA-6B expeditionary squadrons currently stationed at NAS Whidbey Island, resulting in a decrease in the number of aircraft and personnel stationed at NAS Whidbey Island that are associated with these squadrons. An EA-18G FRS will replace the EA-6B FRS. However, the EA-18G FRS will consist of 12 aircraft, whereas the EA-6B FRS consists of 20 aircraft. The EA-18G FRS will have fewer aircraft than the EA-6B, as the EA-18G FRS will no longer train replacement aircrews for Marine Corps and Naval Reserve EA-6B squadrons or the expeditionary squadrons. The EA-18G FRS will train replacements only for the EA-18G CVW squadrons.

The number of personnel associated with the Naval Aviation Technical Training Unit (NATTU) will also likely decrease, as some of the technical training will be conducted at NAS Lemoore, where the West Coast F/A-18 E/F squadrons are based, due to the commonality of the aircraft systems. In addition, while the EA-6B NATTU trains expeditionary, Marine Corps, and Naval Reserve squadron maintenance personnel, the EA-18G NATTU will only train personnel to maintain the EA-18G CVW squadrons and FRS. Therefore, given that the size and student load at the NATTU at NAS Whidbey Island will decrease, the number of instructor personnel also will likely decrease. However, the decrease in personnel is expected to be minor (U.S. Department of the Navy 2003b; Baranowski 2004).

Although the primary types of mission training and readiness requirements for the EA-18G squadrons will remain virtually the same as those for the EA-6B squadrons currently stationed at NAS Whidbey Island (with the exception of an additional air-to-air combat training requirement not currently applicable to the EA-6B aircrews) (Table 1-3), the number of operations are projected to be fewer in 2013 due to the disestablishment of the expeditionary squadrons and decrease in the number of operations required to meet the training syllabus and readiness requirements. Nevertheless, there will be no change in the training syllabus that would cause

changes to the types of flight operations flown by the EA-6B (arrivals, departures, pattern operations), the locations of flight operations (flight tracks over land or water), or the current ratio of daytime and nighttime flight operations at Ault Field or OLF Coupeville. In addition, there will be no change to the number or type of flight operations within national airspace, designated SUA, and in the low-altitude MTRs from what has been conducted by the EA-6B squadrons for several decades.

Table 1-3 Flight Operation Changes for the Replacement EA-18G Aircraft at NAS Whidbey Island

Operations	EA-6B Squadrons	EA-18G Squadrons	Net Change[1] in Operations
Arrivals	4,816	4,588	
Departures	4,816	4,588	
Patterns Operations (Ault Field)	36,662	31,345	
Patterns Operations (OLF Coupeville)	7,682	6,120	
Total	**53,976**	**46,641**	**(7,335)**

Source: Wyle Laboratories, Inc., 2004a.

[1] Numbers in parentheses denote a decrease.

1.3 Purpose and Need

The purpose and need for the proposed action is to maintain the Navy's Airborne Electronic Attack (AEA) capability at NAS Whidbey Island by replacing the EA-6-B airframe, which is nearing the end of its service life, with EA-18G airframe and providing the facilities and functions in support of the replacement without negatively affecting the Navy's readiness to carry out the AEA mission.

The EA-6B aircraft has conducted the Navy's AEA mission for more than 30 years. Although the airframe has remained operationally viable through systematic upgrades, it is approaching the end of its service life. The EA-6B Program of Record, beginning in the Fiscal Year 2004 budget, reflects the initial stages of drawdown; the airframe should be retired by 2012. The Presidents Budget for fiscal year 2005 (PB-05) and Program Objective Memorandum for fiscal year 2006 (POM-06) both reflect programmatic decisions to reduce support of this aging airframe. At the same time, corresponding increases in the replacement platform, the EA-18G, are being programmed. As a result, any delay in the transition from the EA-6B airframe to

the EA-18G airframe will result in degradation in the Navy's Airborne Electronic Attack (AEA) capability.

In order to meet the National Security needs of the United States, the Navy must maintain a robust airborne electronic attack (AEA) capability during the transition to the EA-18G. The Navy must also maintain the capability to surge the AEA force in response to the ongoing Global War on Terrorism during the transition. These mission requirements must be balanced with the need to recapitalize the fleet and efficiently divest old airframes with high operational costs. The AEA capability currently resides entirely at NAS Whidbey with the EA-6B aircraft.

Navy considered all relevant factors before determining that, in order to maintain force readiness and surge capability during the transition to the EA-18G, the AEA mission should remain at NAS Whidbey. Specifically, Navy analyzed operational requirements, aircraft delivery timeline, overall cost, and the ability to efficiently maintain the required level of AEA capability during the transition process. The results of this analysis revealed that maintaining the AEA mission at NAS Whidbey maximizes operational capabilities by offering several advantages over splitting the AEA mission among several sites. Specifically, single siting the AEA mission offers:

a. **Operational Synergy**. Historically, the Navy AEA community expertise has been concentrated in one place where fleet squadrons, the Fleet Replacement Squadron (FRS), and weapon school interact daily developing and refining tactics, standardizing procedures and promoting a sound community-wide knowledge base in this highly specialized mission area.

b. **Operational Efficiencies**. Collocation of the fleet squadrons, the FRS, type wing, and weapon school improves standardization in operations, training, and maintenance practices. Additionally, aircraft inventory management is simplified when all assets are co-located. This is especially significant considering the small number of aircraft within the community.

c. **Personnel Efficiencies**. Collocation avoids duplication of personnel in the type wing, weapon school and intermediate maintenance facility. It also provides maximum flexibility in manpower management allowing short-notice personnel shortages to be filled quickly and efficiently.

d. **Equipment Efficiencies**. Collocation avoids duplication of EA-18G specific equipment and facilities such as aircrew simulators, ALQ-99 electronic attack pods, and intermediate maintenance.

These operational advantages are especially significant due to the relatively small size of the AEA community and the complexity and cost of the weapons system.

In addition to maximizing operational capabilities, the infrastructure requirements and environmental concerns that have led Navy to split-site larger aircraft inventories do not exist for the proposed action. The proposed action will actually decrease the number of AEA aircraft in the Navy's inventory; 57 EA-18G aircraft will replace the current inventory of 72 EA-6B aircraft. Maintaining the AEA mission at NAS Whidbey was preliminarily assessed as both the operationally and environmentally preferred method for transition to the EA-18G. By contrast moving the AEA mission to other sites would entail additional construction, budgeting, and planning costs and would potentially entail significant environmental impacts.

Maintaining the current AEA capabilities at NAS Whidbey provides the most efficient, economical, and operationally sound method to recapitalize the fleet and efficiently divest old airframes with high operational costs. Currently, NAS Whidbey and the surrounding area meet all training and readiness requirements for the AEA, air-to-ground, and air-to-air missions. Therefore, the replacement of the EA-6B with EA-18G aircraft at NAS Whidbey avoids having to increase the type and tempo of operations at other bases and ranges.

Additionally, decreasing the EA-6B fleet, a process set in motion last year, without a corresponding increase in the EA-18G fleet will result in a degradation of responsiveness and fleet readiness. Therefore, an unhindered transition process is imperative and the receiving location must be able to support the 2009 Initial Operational Capability date. Accordingly, in order to meet the Fiscal Year 2012 retirement date of the EA-6B without a loss of AEA capability, the first squadron must begin the transition process in early Fiscal Year 2008.

The 3-year timeframe includes the time required for training syllabi completion (aircrew and maintenance personnel), acceptance of new aircraft and establishment of fully functional maintenance programs within the 10 fleet squadrons. It does not account for the time required to complete planning, construction projects, installation of support equipment and training devices, and establishment of schoolhouses (Fleet Replacement Squadron, Center for Naval Aviation Technical Training Unit, and Weapon School) and maintenance support facilities (Air Intermediate Maintenance Department and Aviation Supply Department). Maintenance of the optimum AEA readiness and surge capability requires a level AEA force structure during the 3-

year transition period. Retaining the AEA mission at NAS Whidbey will allow optimum AEA readiness during the three-year transition phase.

NAS Whidbey is the current home of the Navy Tactical Electronic Warfare (VAQ) community which will transition from the EA-6B to the EA-18G aircraft. The weapons system of the VAQ community will remain the Airborne Countermeasures Multipurpose/Special Equipment 218 (AN/ALQ-218) and will be used on the EA-18G. The same infrastructure that supports the AN/ALQ-218 weapons system resides at Whidbey Island. It is a one-for-one capability exchange of the existing Department of Defense (DoD) AEA infrastructure. The EA-18G, a variant of the F/A-18 F "Super Hornet" strike-fighter aircraft, will be equipped with the same weapons systems as the EA-6B, which will allow it to perform the AEA mission currently performed by the EA-6B community. Given the similarities between the EA-6B and EA-18G, the primary mission training and readiness requirements will be nearly identical. By combining two proven systems (i.e., the F/A-18 F airframe and the EA-6B weapons system), the Navy will maximize the benefit of ongoing investments while allowing for an initial operational capability by 2008.

Finally, The EA-6B community of personnel, equipment, and mission-related functions has been performing the AEA mission at NAS Whidbey Island since 1971. Consequently, NAS Whidbey Island and the surrounding area meet all of the necessary requirements for the AEA mission. Moreover, with its 30-year history at NAS Whidbey Island, the AEA community has expertise and leadership in training pilots and weapons system operators in warfare skills, as well as a cadre of expert maintenance and support personnel.

In summary, NAS Whidbey Island meets all of the operational requirements of the EA-18G, including provision of operational synergy, operational efficiencies, personnel efficiencies, and equipment efficiencies. NAS Whidbey is the home of the current VAQ community, is the only installation that will support the transition timeline, and has historically provided the Navy's AEA capability for over thirty years. For these reasons, the Navy is proposing to replace the EA-6B with the EA-18G airframe and provide the facilities and functions to support the EA18G aircraft, thus maintaining the AEA capability at NAS Whidbey Island.

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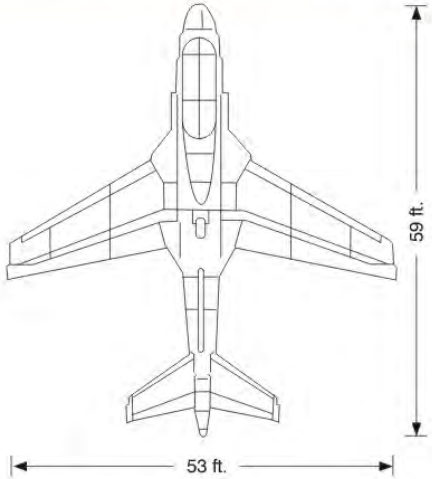
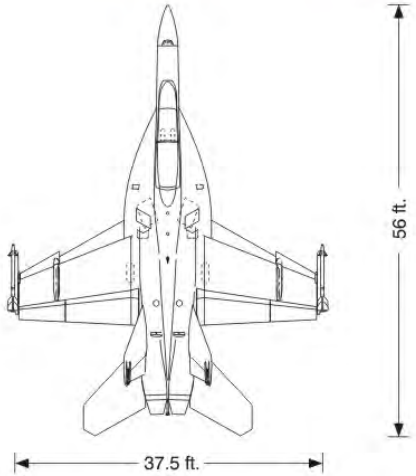
EA-6B PROWLER
Year Entered Fleet: 1971



- Crew: 1 pilot, 3 electronic countermeasures officers
- Range: 1,100 nm (with 5 pods)
- Top Speed: Mach 0.99
- Weapons: Air-to-ground capability
- Engine: 2 Pratt & Whitney J52-P408 turbofans
- Thrust: 11,200 pounds/engine

EA-18G GROWLER
Year Entered Fleet: 2008 (Planned)



- Crew: 1 pilot, 1 electronic countermeasures officer
- Range: 1,275 nm
- Top Speed: Mach 1+
- Weapons: Air-to-air and air-to-ground capability
- Engine: 2 General Electric F404-GE-400 afterburning, low-bypass turbofans
- Thrust: 16,000 pounds/engine

Figure 1-3 The EA-6B and the EA-18G

2 Alternatives Including the Proposed Action

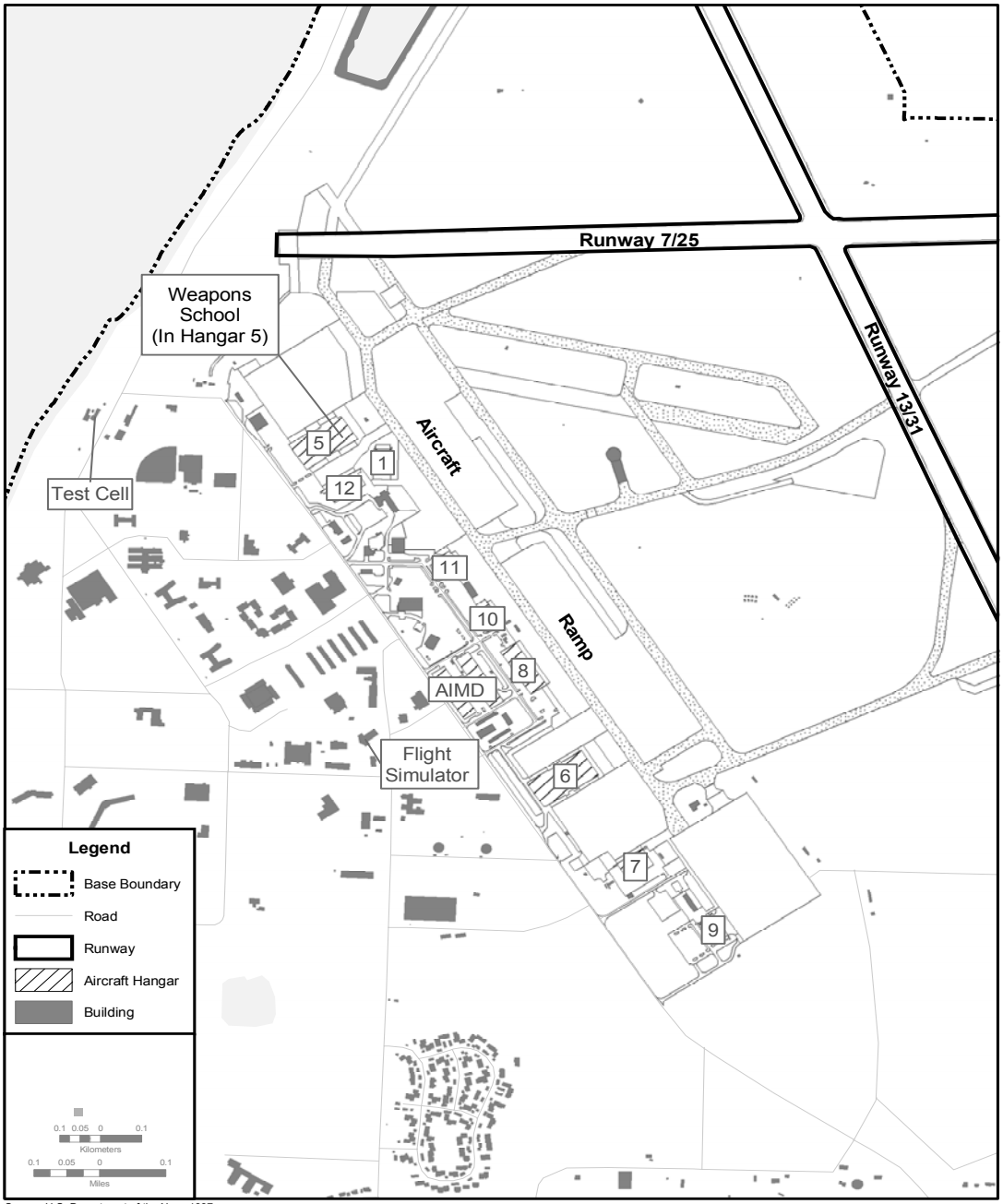
2.1 Proposed Action

The Navy proposes to provide facilities and functions to support the replacement of the EA-6B aircraft at NAS Whidbey Island with the EA-18G aircraft. Because the EA-18G squadrons will perform the same mission as the EA-6B squadrons, many of the facilities and functions at NAS Whidbey Island that have supported the EA-6B squadrons will continue to support the EA-18G squadrons (Figure 2-1), although the use of those facilities and functions may have indirect effects on the environment related to differences in the airframe and aircraft components (e.g., engine) or performance of the aircraft (e.g., noise and air emissions) (Figure 1-3).

The types of facilities needed to support the EA-18G aircraft include operational (e.g., hangars, parking, runways), training (e.g., flight simulators, classrooms, airspace, ranges), maintenance, support (e.g., warehouses), and personnel (e.g., medical and dental clinics, housing) facilities. Functions to support the EA-18G aircraft squadrons comprise the combination of personnel, airfield and airspace use, and established procedures to conduct the range of aircraft operations at the air station and other training areas, including flight operations (e.g., FCLP), to support the readiness of these squadrons. In general, the functions and facilities needed to support the EA-18G aircraft are very similar to existing facilities and functions supporting the EA-6B aircraft (Table 2-1).

2.2 Alternatives Development

The environmental consequences of the Navy's Proposed Action to provide facilities and functions at NAS Whidbey Island to support replacement of the EA-6B with the EA-18G aircraft are associated with changes to aircraft operation, personnel transitions, and new construction or renovation of structures at NAS Whidbey Island (Table 2-1). Accordingly, the Navy focused its alternatives analysis on the construction or renovation of structures at NAS Whidbey Island to accommodate the EA-18G squadrons. The potential environmental consequences associated with changes in aircraft operation and personnel, therefore, would be expected to occur under each alternative.



Source: U.S. Department of the Navy 1997.

Figure 2-1 Flightline Facilities (Ault Field)
NAS Whidbey Island

Table 2-1 Facilities and Functions Analysis

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Administration		
Type Wing – collocated with squadrons to provide monitoring, management, and support functions.	Commander, Electronic Attack Wing Pacific (CVWP) provides administrative control of the EA-6B CVW squadrons and FRS.	Functions and Facilities: No additions to administrative facilities or functions are needed to support the EA-18G squadrons at NAS Whidbey Island. Personnel: The size and composition of CVWP will remain the same following replacement of the EA-6B squadrons with the EA-18G squadrons.
Training		
Weapons Schools	The Electronic Attack Warfare School (EAWS) at NAS Whidbey Island provides graduate-level aircrew training and AEA tactics instructors to the EA-6B squadrons.	Functions and Facilities: No additional facilities or functions for classroom training are needed. Personnel: The size and composition of the EAWS will remain the same following replacement of the squadrons with the EA-18G. EA-6B instructors will be retrained to perform instruction on the EA-18G electronic weapons systems.
Naval Aviation Technical Training Unit (NATTU)	The NATTU at NAS Whidbey Island trains maintenance personnel to effectively repair and maintain the EA-6B aircraft. Facilities within the existing NATTU include trainers for the armament system, avionics system, flight control system, landing gear/hydraulic system, fuel system, and electrical systems of the aircraft.	Functions and Facilities: Internal modifications to training aids are necessary to support EA-18G technical training. However, these modifications will not require additional functions or facilities at NAS Whidbey Island. Personnel: The size and composition of the NATTU will decrease following replacement of the EA-6B with the EA-18G, as some F/A-18 series technical training will be conducted at NAS Lemoore. EA-6B instructors will be retrained to perform instruction on the EA-18G aircraft.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Simulator	The EA-6B CVW squadrons and FRS use aircraft simulators on a daily basis for various familiarization, qualification, and refresher training.	Functions and Facilities: The EA-18G simulators will be installed in current EA-6B simulator facilities, and some internal modifications will be required to support these new devices. Whereas the pilot and the electronic countermeasures officer (ECMO) have separate simulators for the EA-6B, the EA-18G simulator is configured for both the pilot and the ECMO and can support individual or crew training. Personnel: No change.
Flight Operations		
Training Syllabus	EA-6B flight operations are based on the CVW squadron and FRS training syllabus (e.g., qualification, currency, and readiness requirements for the EA-6B aircrew).	Functions and Facilities: No additional flight training functions or facilities are required to continue AEA flight training at NAS Whidbey Island following replacement of the EA-6B with the EA-18G. The primary types of mission training and readiness requirements for the EA-18G will remain virtually the same as those for the EA-6B currently stationed at NAS Whidbey Island, with an additional air-to-air combat training requirement that the EA-6B crews do not currently have. Nevertheless, there will be no change in the training syllabus that would cause changes to the use of NAS Whidbey Island and surrounding areas. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Airfield Hours – 24-hour capability needed to accommodate operations at night.	Ault Field is operational 24 hours/day, 7 days/week throughout the year. OLF Coupeville is available for FCLP on weekdays between 7:00 a.m. and 12:00 midnight (with extensions available until 2:00 a.m. on a case-by-case basis during the summer months).	Functions and Facilities: No additional functions or facilities are required to continue AEA flight training at NAS Whidbey Island following replacement of the EA-6B with the EA-18G. The primary types of mission training and readiness requirements for the EA-18G will remain virtually the same as those for the EA-6B currently stationed at NAS Whidbey Island. Airfield hours at NAS Whidbey Island satisfy the training and readiness requirements of the EA-18G squadrons. Personnel: No change.
Compatible Field Operations – airspace use by other users needs to be compatible with tactical jet aircraft operations.	The EA-6B CVW and FRS squadrons conduct flight operations concurrent with P-3C/EP-3s, C-9s and other permanent and transient aircraft operating at Ault Field and within the local and regional airspace.	Functions and Facilities: EA-18G training operations will be compatible with use of the airfields, airspace, operating areas, and ranges by other users. No additional functions or facilities are required for compatible operation of these aircraft with other permanent and transient aircraft at Ault Field and within the local and regional airspace. Personnel: No change.
Multiple Runways – multiple runways are needed to support the tempo of operations. The primary runway must be at least 8,000 feet long. Parallel runways are preferred for FCLP. If parallel runways are not available, there must be an OLF with 50 NM.	Ault Field has two 8,000-foot-long runways with precision approaches and arresting gear. The runway at OLF Coupeville is 5,400 feet long.	Facilities and Functions: No additional functions or facilities are required for suitable runways. Ault Field has multiple runways of required length with precision approaches usable by the avionics suite installed in the EA-18G. The runways have arresting gear, and both Ault Field and OLF Coupeville will have an Improved Fresnel Lens Optical Landing System (IFLOLS) prior to the initial squadron replacement of the EA-6B with the EA-18G. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
FCLP Facility – must support FCLP flight tracks representative of those flown during aircraft carrier operations (e.g., a left-hand pattern at 600 feet above ground level [AGL]).	EA-6B aircrews conduct FCLP operations at Ault Field and OLF Coupeville. They are scheduled to be configured with an IFLOLS, and also have a lighted carrier box and Landing Signals Officer (LSO) communications suite. The airfields are available for daytime and nighttime FCLP training.	Functions and Facilities: No additional FCLP functions or facilities are required to support the replacement of the EA-6B with the EA-18G. Personnel: No change.
Combat Aircraft Loading Area (CALA)	Weapons loading, storing, and handling areas are available at Ault Field. The Weapons Department at NAS Whidbey Island is responsible for storing weapons for, and loading weapons onto, Navy tactical jet aircraft.	Functions and Facilities: No additional functions and facilities are required specifically for loading, storing, and handling live weapons used by the EA-18G squadrons. Personnel: No change.
Refueling Capability	NAS Whidbey Island has facilities and functions for both cold and hot refueling evolutions on Navy tactical jet aircraft. Conducting flight training operations requires both a cold (engines shut off) and hot (engines running) refueling capability. Navy tactical jet aircraft (including EA-6B and F/A-18 series airframes) are currently cold and hot refueled at NAS Whidbey Island.	Functions and Facilities: No additional refueling functions or facilities are required to conduct cold and hot refueling evolutions at NAS Whidbey Island following replacement of the EA-6B with the EA-18G. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Operating Areas (OPAREA)		
AEA OPAREA - EA-18G CVW squadrons and FRS require activating the transmitters and receivers of the ALQ-218 weapon systems within an AEA OPAREA without affecting civilian or military air traffic control radars or causing other radio frequency interference (RFI). Two suitable AEA OPAREAs need to be available simultaneously on a daily basis. Suitable AEA OPAREAs have vertical airspace available from the surface to 30,000 feet above mean sea level (MSL), have lateral dimensions of at least 30 NM by 60 NM, and are within 200 NM (preferably 120 NM) of the aircraft's home station. The AEA OPAREA must have a fixed or mobile threat emitter capable of providing jammer power effectiveness feedback and calibration of both active and passive transmitter and receiver systems.	The "Darrington West Area" (overhead Ault Field) and "Darrington East Area" (to the east of Ault Field) are both suitable AEA OPAREAs where EA-6B aircrews have conducted AEA training with either or both 15E34A and FSQ fixed threat emitter systems using various tactical jamming systems (TJSs) for the last three decades. Currently, EA-6Bs use the ALQ-99 TJS across all required frequency spectrums in the Darrington Areas without causing RFI with air traffic control radars or radio frequency communications systems. A current Navy program is under way to upgrade/convert some EA-6B ALQ-99 TJS to the ALQ-218 TJS. That conversion will be completed and the ALQ-218 system will be in use by EA-6B aircraft prior to replacement of the EA-6B with the EA-18G.	Facilities and Functions: No additional functions or facilities will be required to continue conducting AEA training within OPAREAs near NAS Whidbey Island following replacement of the EA-6B with the EA-18G. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Air-To-Air OPAREA - EA-18G squadrons will require one air-to-air OPAREA on a daily basis. Suitable air-to-air OPAREAs have vertical dimensions between 5,000 feet AGL and 50,000 feet MSL, lateral dimensions of 50 NM by 80 NM or greater, be capable of supporting supersonic operations, and be within 200 NM (preferably 120 NM) of the aircraft's home station.	Air-to-air combat training operations occur in Warning Area (W) – 237 and the Olympic, Okanogan, and Roosevelt Military Operating Areas (MOAs). W-237 and the Olympic, Okanogan, and Roosevelt MOAs are within 200 NM of Ault Field and are suitable for air-to-air combat training.	Functions and Facilities: No additional functions or facilities will be required to conduct air-to-air training within OPAREAs near NAS Whidbey Island following replacement of the EA-6B with the EA-18G. Personnel: No change.
Air-To-Ground Range	W-237 and NWSTF Boardman are suitable air-to-ground ranges located within 200 NM of NAS Whidbey Island. Inert and live weapons deliveries have been conducted at NWSTF Boardman and in W-237, respectively, for several decades. NWSTF Boardman and W-237 can support continued use for inert and live weapons deliveries.	Facilities and Functions: No additional air-to-ground range functions or facilities will be required for EA-18G aircrews to release inert or live air-to-ground weapons on detachment. The limited types of air-to-ground weapons and tactics to be used by the EA-18G do not require the use of W-237 or NWSTF Boardman for ordnance delivery. Air-to-ground ordnance delivery will be conducted elsewhere. No additional air-to-ground range functions or facilities will be required within ranges near NAS Whidbey Island should EA-18G squadrons find it occasionally necessary to release air-to-ground weapons in W-237 or at NWSTF Boardman. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Maintenance		
Aircraft Maintenance Hangars - EA-18G CVW squadrons and FRS will require approximately 240,000 square feet of hangar space.	Nine aircraft maintenance hangars are located at Ault Field. Aircraft maintenance hangars house much of the maintenance, training, and administrative functions of the squadrons.	Functions and Facilities: With replacement of the EA-6B squadrons with EA-18G squadrons and the disestablishment of the expeditionary squadrons, capacity is available in hangars 5, 8, 9, 10, and 12. Personnel: No change.
Aircraft Intermediate Maintenance Detachment (AIMD)	Complex aircraft component repairs are conducted at the AIMD at NAS Whidbey Island. The AIMD includes an airframes shop, engine maintenance shop, avionics shop, aviation armament shop, and battery shop.	Functions and Facilities: Internal modifications are required to support maintenance activities on the EA-18G; however, no additional functions or facilities for the AIMD are required at NAS Whidbey Island. Specialized equipment is required to provide intermediate aircraft maintenance support for EA-18G-specific systems, including ALQ-99 pods and ALQ-218 electronic weapons systems. Personnel: Specialized EA-6B technicians will be retrained to perform maintenance and repair on the EA-18G aircraft.
Engine Test Cell	Two engine test cells are located at Ault Field; however, one is on permanent standby status. Engine test cells are used to repair, maintain, and test jet engines.	Functions and Facilities: No additional functions or facilities for the engine test cells are needed. Because the EA-18G has a different engine than the EA-6B, internal modifications to the existing engine test cells at NAS Whidbey Island will be required. Personnel: No change.

Table 2-1 Facilities and Functions Analysis (continued)

Facilities and Functions Needed to Support the EA-18G	Status of Facilities and Functions at NAS Whidbey Island to Support the EA-6B	Changes to Facilities and Functions at NAS Whidbey Island to Support the EA-18G
Other Facilities and Functions		
Supply Facilities	Various supply facilities are available at NAS Whidbey Island and, with replacement of the EA-6B squadrons with EA-18G squadrons and the disestablishment of the expeditionary squadrons, these facilities can accommodate the requirements of the EA-18G squadrons.	Facilities and Functions: No additional facilities or functions are needed for warehouse or storage requirements for the EA-18G. Personnel: No change.
Personnel Support and Housing Facilities	Bachelor enlisted and officer housing, family housing, medical and dental facilities, recreational facilities, and child development center are available and adequate at NAS Whidbey Island.	Facilities and Functions: No additional facilities or functions are needed for the personnel support or housing requirements associated with the EA-18G squadrons. Personnel: No change.

Source: U.S. Department of the Navy 2003c.

2.3 Description of Alternatives

2.3.1 Alternative 1: Minor Facilities Modifications (Preferred Alternative)

The Navy's preferred alternative is to provide minor modifications to the existing facilities at NAS Whidbey Island, as identified in Table 2-1, to accommodate the EA-18G aircraft squadrons. Internal modifications to existing facilities would be necessary for the simulators, engine test cell, NATTU, and AIMD (Table 2-1). These modifications include minor changes to room configuration, electrical power routing, heating, ventilation, air conditioning (HVAC), mountings for replacement equipment, etc.

2.3.2 Alternative 2: Additional Facilities Construction

During the planning review of existing facilities, it was found that existing hangar facilities have not been upgraded in some time (MAKERS 2002). Thus, to provide flexibility to meet maintenance, training, and administrative functions, existing hangar space could be augmented. Facility improvement could occur either through construction of an additional hangar or of an addition to an existing hangar. Constructing an additional hangar is expensive and without proven benefit to meeting mission requirements and, thus, is not a reasonable alternative. Use of existing spaces may require maintenance actions to accommodate the new aircraft in smaller spaces. Some additional space would provide improved flexibility in meeting aircraft storage and maintenance requirements. Therefore, a hangar addition was proposed as a reasonable alternative to using existing facilities.

Similar to the preferred alternative (Alternative 1), internal modifications to existing facilities would still be completed for the simulators, engine test cell, NATTU, and AIMD (Table 2-1) and would include minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc.

An estimated 20,000-square-foot hangar addition would be constructed adjacent to Hangar 10 (Figure 2-2). This modification would be constructed consistent with existing land use and the NAS Whidbey Island Base Exterior Architecture Plan, on land already developed with tarmac and connected to existing service utilities. Using standard military aircraft hangar construction methodology, it is estimated that the 20,000-square-foot hangar addition would cost approximately $6.7 million to build (DoD 2003; RS Means 2004a,b). Assuming a 10-month

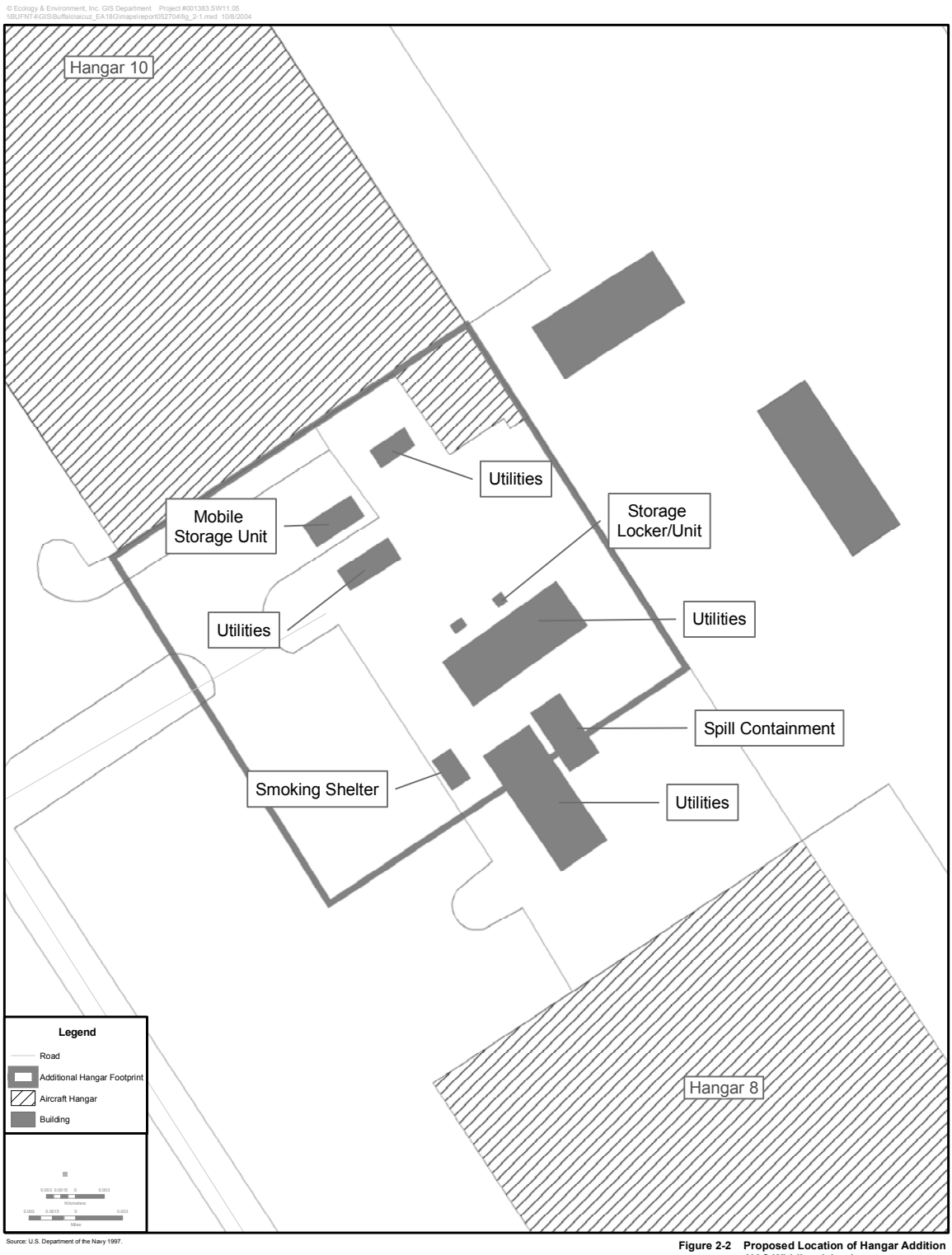


Figure 2-2 Proposed Location of Hangar Addition NAS Whidbey Island

Figure 2-2 Proposed Location of Hangar Addition, NAS Whidbey Island

construction period, approximately 20 to 30 part-time construction workers would be utilized throughout the project at various times, depending on their trade.

2.3.3 No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and would continue to perform its AEA mission until the airframe becomes obsolete. Under this alternative, none of the required facilities or functions modifications described in Table 2-1 would occur. Thus, there would be no internal modifications to the NATTU, the simulators, the AIMD, or the engine test cell, or retraining of personnel at the weapons school and NATTU. Not executing the Proposed Action would not meet the Navy's need to conduct the AEA mission. The no-action alternative would not meet operational requirements and would not meet the need for the Proposed Action.

2.4 Comparison of Alternatives

2.4.1 Environmental Resources Related to the Proposed Action

The environmental consequences of the Navy's action to provide facilities and functions to support replacement of the EA-6B with the EA-18G are associated with changes in aircraft operations, personnel transitions, and new construction or modification of facilities at NAS Whidbey Island. The following environmental resources were included in this evaluation as they are directly applicable to the Proposed Action:

Physical Factors:

- Noise,
- Air Quality,
- Hazardous Materials and Waste Management,
- Water Quality,

Biological Factors:

- Wildlife,
- Threatened and Endangered Species,

Socioeconomic Factors:

- Population and Housing,
- Economy,
- Land Use, and
- Cultural Resources.

2.4.2 Summary of Environmental Consequences of the Proposed Action

The following section summarizes the potentially significant environmental consequences associated with replacement of the EA-6B squadrons with EA-18G squadrons at NAS Whidbey Island, as well as each of the alternatives, to provide facilities and functions to support the replacement aircraft. The comparison of all environmental consequences evaluated is presented in Table 2-2.

2.4.2.1 Alternative 1: Minor Facilities Modifications

The Proposed Action would result in no significant impacts under Alternative 1: Minor Facilities Modifications. Under this alternative, NAS Whidbey Island would provide facilities and functions to support the EA-18G squadrons with minimal change to existing facilities or functions. These modifications include minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc., none of which would significantly impact the natural or socioeconomic environment.

Replacement of the EA-6B with the EA-18G will have a positive impact on the noise environment. The DNL noise metric was used to evaluate the change in the existing (calendar year [CY] 2003) and projected (CY 2013) noise environment, with a greater than 65-dB DNL noise contour considered high noise exposure. Implementation of the Proposed Action will result in a 36% reduction in the population exposed to aircraft noise greater than 65-dB DNL around Ault Field, and a 16% reduction in the population exposed to aircraft noise greater than 65-dB DNL around OLF Coupeville. Similarly, implementation of the Proposed Action will result in a 28% decrease in the land area, and a 38% reduction in the number of housing units within the greater than 65-dB DNL noise contour around Ault Field. Implementation of the

Proposed Action will result in a 9% decrease in the land area, and a 16% reduction in the number of housing units within the greater than 65-dB DNL noise contour around OLF Coupeville.

Replacement of the EA-6B with the EA-18G will have no significant impact on local air quality. Annual mobile source emissions of carbon monoxide (CO), nitrogen dioxide (NO_2), and volatile organic compounds (VOCs) are projected to increase with replacement of the EA-6B with the EA-18G. Annual mobile source emissions of particulate matter (PM_{10}) and sulfur dioxide (SO_2) are projected to decrease. Increases in CO, NO_2, and VOCs are not considered to be a significant impact on regional air quality, because they represent less than 1% of the total annual mobile source emissions within the three-county Northwest Air Pollution Authority (NWAPA) region. The NWAPA is in attainment for all criteria pollutants, and the increase would not cause the region to be in violation of any of the National Ambient Air Quality Standards (NAAQS).

Stationary source emissions of CO from the test cell are projected to increase and emissions of VOCs, NO_X, SO_2 and PM_{10} are projected to decrease. Increased emissions of CO are not considered to be a significant impact on regional air quality, as the projected increases are well below the Prevention of Significant Deterioration (PSD) threshold as defined under the Clean Air Act.

Replacement of the EA-6B squadrons with EA-18G squadrons will result in a reduction of 1,106 in personnel, which will impact the on-station and regional population in Island County, if the personnel are reassigned outside of the local area. However, as the reduction in personnel will occur over a 6-year period, the annual reduction in personnel will range from 1% to 4% of the on-station population in CY 2003. The total reduction in personnel will represent a loss of only 3% of the Island County population in 2000. Considering that the reduction will occur over a 6-year period, that the population of Island County is projected to continue its growth trend, that the military personnel will be reassigned to other Naval installations, and that the number of civilian personnel will not be reduced, neither the economy, population, schools, or housing within Island County or its municipalities will be significantly affected.

Table 2-2 Comparison of Alternatives

	Alternative 1 Minor Facilities Modifications	Alternative 2 Additional Facilities Construction	No-Action Alternative
Physical Factors			
Noise	Comprehensive reduction in population, land area, and housing units within the greater than 65-dB DNL noise zone for Ault Field and OLF Coupeville (Table 3-1 and Table 3-2). Minor increase in construction-related noise associated with interior modifications; temporary for duration of projects, and localized.	Same as Alternative 1. In addition, minor increase in construction-related noise during construction of hangar addition for a 10-month construction period.	No change from existing conditions.
Air Quality	Reduction in mobile source emissions of PM10 and SO2, and an increase in mobile source emissions of CO, NO2, and VOCs (Table 3-8). Minor increase in emissions as compared to total mobile source emissions from the region (Table 3-9).	Same as Alternative 1. In addition, minor increase in construction-related emissions during construction of hangar addition for a 10-month construction period.	No change from existing conditions.
Hazardous Materials and Waste Management	No effect on hazardous materials and waste management program at NAS Whidbey Island. Estimated reduction in hazardous waste generation based on annual per aircraft comparison of EA-6B (1,700 pounds/aircraft) and F/A-18 E/F (1,000 pounds /aircraft).	Same as Alternative 1.	No change from existing conditions.
Water Quality	No effect on the quality or quantity of wastewater discharges to the water conveyance system.	Same as Alternative 1.	No change from existing conditions.

Table 2-2 Comparison of Alternatives

	Alternative 1 Minor Facilities Modifications	Alternative 2 Additional Facilities Construction	No-Action Alternative
Biological Factors			
Wildlife	No adverse impacts on wildlife or wildlife habitat. Reductions in anticipated flight operations may result in a positive effect on wildlife.	Same as Alternative 1.	No change from existing conditions.
Threatened and Endangered Species	No effect.	Same as Alternative 1.	No change from existing conditions.
Socioeconomic Factors			
Population and Housing	Minor reduction in average on-station population by 1,106 military personnel occurring between 2008 and 2012; not significant.	Same as Alternative 1.	No change from existing conditions.
Economy and Employment	Reduction in 1,106 military personnel results in a 3% loss in annual personal earnings for Island County occurring between 2008 and 2012; not significant.	Same as Alternative 1. Construction of the hangar addition would have a minor positive impact on the economy.	No change from existing conditions.
Land Use	Consistent with existing land use, including applicable federal, state, and local land use plans and policies.	Same as Alternative 1.	No change from existing conditions.
Cultural Resources	No effect on historic resources or archaeological resources as a result of the proposed undertaking due to a comprehensive reduction in noise over such resources.	Same as Alternative 1.	No change from existing conditions.

2.4.2.2 Alternative 2: Additional Facilities Construction

The Proposed Action would result in no significant impacts under Alternative 2: Additional Facilities Construction. Similar to Alternative 1, NAS Whidbey Island would provide some minor modifications to existing facilities, including minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc. In addition, NAS Whidbey Island will construct an addition to Hangar 10 (approximately 20,000 square feet) to provide improved flexibility in meeting aircraft storage and maintenance requirements.

Similar to Alternative 1, replacement of the EA-6B with the EA-18G will have a positive impact on the noise environment. The DNL noise metric was used to evaluate the change in the existing (CY 2003) and projected (CY 2013) noise environment, with a greater than 65-dB DNL noise contour considered high noise exposure. Implementation of the Proposed Action will result in a 36% reduction in the number of persons exposed aircraft noise greater than 65 dB DNL around Ault Field and a 16% reduction in the population exposed to aircraft noise greater than 65 dB DNL around OLF Coupeville. Similarly, implementation of the Proposed Action will result in a 28% decrease in the land area, and 38% fewer housing units within the greater than 65-dB DNL noise contour around Ault field. Implementation of the Proposed Action will result in a 9% decrease in the land area, and a 16% reduction in the number of housing units within the greater than 65-dB DNL noise contour around OLF Coupeville.

Replacement of the EA-6B with the EA-18G will have no significant impact on local air quality. Annual mobile source emissions of CO, NO_2, and VOCs are projected to increase with the replacement of the EA-6B with the EA-18G. Annual mobile source emissions of PM_{10} and SO_2 are projected to decrease. The increases in CO, NO_2, and VOCs are not considered to be a significant impact on regional air quality, because they represent less than 1% of the total annual mobile source emissions within the three-county NWAPA region. The NWAPA is in attainment for all criteria pollutants, and the increase would not cause the district to be in violation of any of the NAAQS.

Stationary source emissions of CO from the test cell are projected to increase, and emissions of VOCs, NO_X, SO_2, and PM_{10} are projected to decrease. Increased emissions of CO are not considered to be a significant impact on regional air quality, as the projected increases are well below the PSD threshold as defined under the Clean Air Act.

Replacement of the EA-6B squadrons with EA-18G squadrons will result in a reduction of 1,106 in personnel, which will impact on-station and regional population in Island County if the personnel are reassigned outside of the local area. However, as the reduction in personnel will occur over a 6-year period, the annual reduction in personnel is between 1% and 4% of the on-station population in CY 2003. The total reduction in personnel will represent a loss of 3% of the Island County population in 2000. Considering that the reduction will occur over a 6-year period, that the population of Island County is projected to continue its growth trend, that the military personnel will be reassigned to other Naval installations, and that no civilian personnel would be reduced, neither the economy, population, schools, or housing within Island County or its municipalities will be significantly impacted.

2.4.2.3 No-Action Alternative

The no-action alternative is represented by the existing conditions.

3 Affected Environment and Environmental Consequences

3.1 Physical Factors

3.1.1 Noise

Noise is generally described as unwanted sound. A sound is regarded as noise when it interferes with normal activities such as sleep or conversation, or when it is subjectively judged to be annoying. Noise analysis thus requires a combination of the physical description of sound produced by an activity and an identification of the potential responses to it.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium such as air. The measurement and human perception of sound involves three basic physical characteristics: amplitude, frequency, and duration. Amplitude is a measure of the strength of the sound and is directly measured in terms of the pressure of the sound wave. The greater the sound pressure, the more energy carried by the sound and, generally, the louder the perception of that sound. The second important physical characteristic of sound is frequency, which is the number of times per second the air vibrates. Frequency is sensed as pitch; low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. The third important characteristic of sound is duration, the length of time the sound can be detected.

The loudest sounds that the human ear can hear have acoustic energy a trillion times that 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. Sound is therefore usually represented on a logarithmic scale with a unit called the decibel (dB). Such a representation is called a sound level. A sound level of slightly above 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 (Berglund and Lindvall 1995).

The minimum change in sound level that the 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 the 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% decrease in sound intensity but only a 50% decrease in

perceived loudness because of the nonlinear response of the human ear (similar to most human senses) (Wyle Laboratories, Inc. 2004a).

In terms of frequency, sound levels are adjusted to the "A-weighted" frequency scale (dBA), which reflects the human ear's sensitivity to different frequencies of sound. A-weighting is assumed for all sound level descriptors in this document.

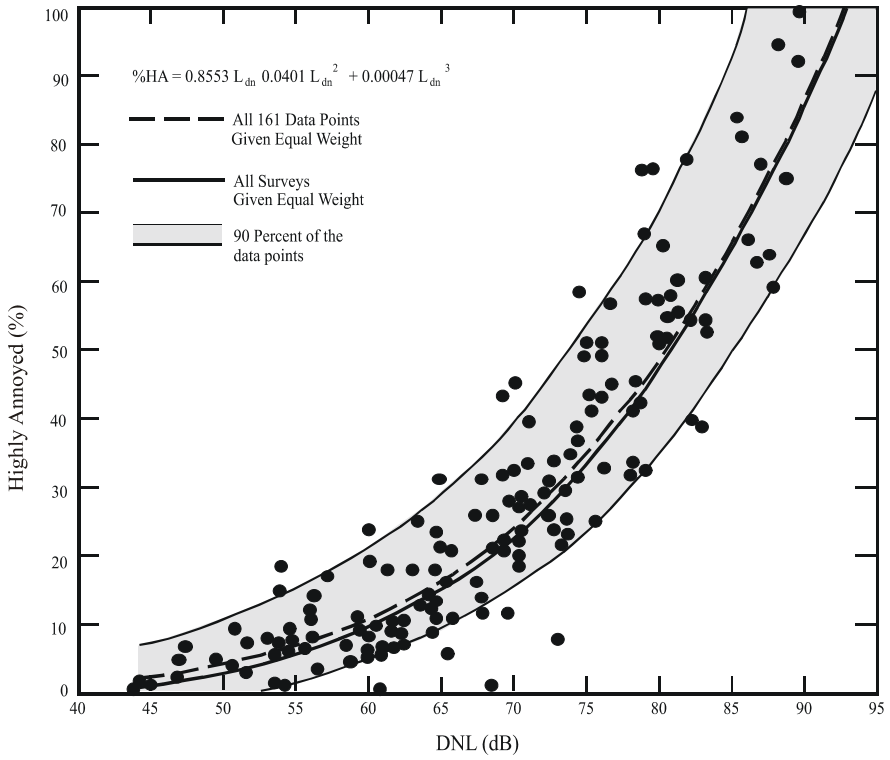
Aircraft noise consists of two major types of sound events: aircraft takeoffs and landings, and engine maintenance operations, or run-ups. The former can be described as intermittent sounds and the latter as continuous. Noise levels from flight operations exceeding ambient background sound levels typically occur beneath main approach and departure corridors, or local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contribution drops to lower levels, often becoming indistinguishable from the background noise.

Noise potentially becomes an issue when its intensity exceeds the ambient or background sound pressures. Ambient background noise in metropolitan, urbanized areas typically varies from 60 to 70 dB and can be as high as 80 dB or greater; quiet suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dB (USEPA 1978).

Since flight operations dominate at an airfield, the resulting noise is highly variable. This variability is best assessed by time-average sound level metrics such as the Day-Night Average Sound Level (DNL). DNL is a composite metric that averages all noise events for a 24-hour period, with a 10-dB penalty applied to nighttime events after 10 P.M. and before 7 A.M. It is an average quantity, mathematically representing the continuous A-weighted sound level that would be present if all of the variations in sound level that occur over a 24-hour period were smoothed out so as to contain the same total sound energy. It is a composite metric accounting for the maximum noise levels, the duration of the events (sorties or operations), and the number of events that occur over a 24-hour period. DNL does not represent the sound level heard at any particular time, but quantifies the total sound energy received.

The 10-dB penalty in DNL is added to those noise events that take place between 10:00 P.M. and 7:00 A.M. the following morning. This 10-decibel penalty accounts for the added intrusiveness of sounds during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Although DNL does not provide specific information on the individual sound events that occur during the day, it does account for both the noise levels of all those individual events and the number of times those events occur. Daily average sound levels are typically used for the evaluation of community noise effects, and particularly aircraft noise effects. In general, scientific studies and social surveys have found a high correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (USEPA 1978; Schultz 1978; Fidell et al., 1991). This correlation, based on the Schultz study, is illustrated in Figure 3-1. It represents the results of a large number of social surveys relating community responses to various types of noises, measured in day-night average sound level (Schultz 1978).

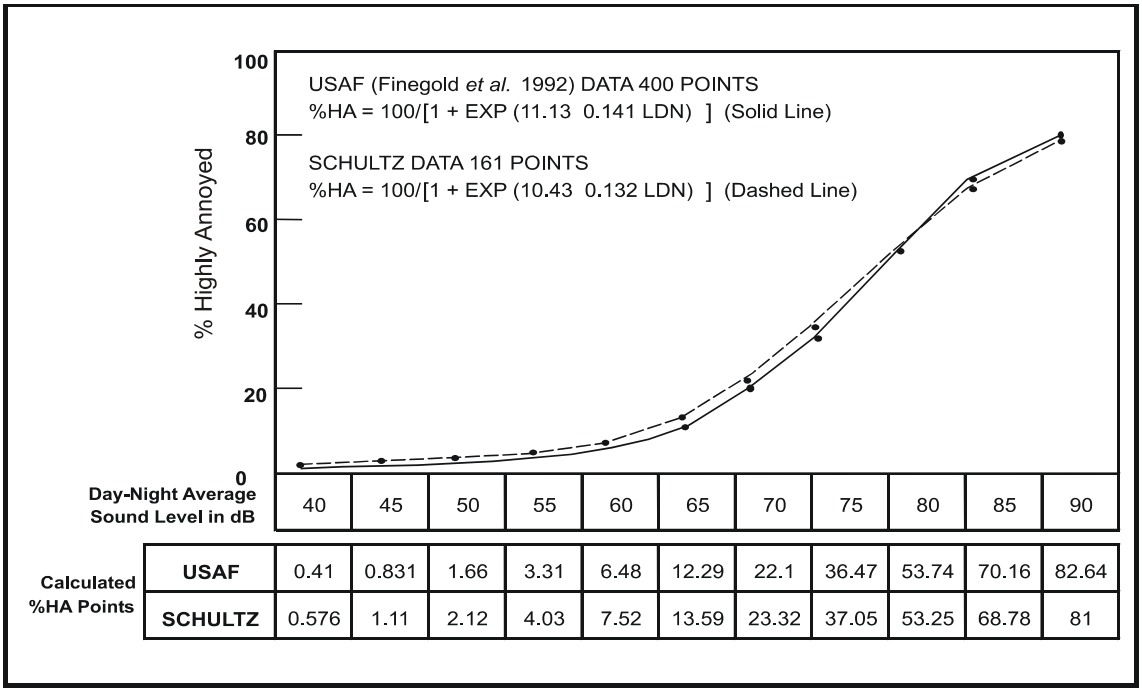


(Source: Schultz 1978)

Figure 3-1 Community Surveys of Noise Annoyance

A more recent study has reaffirmed this relationship (Fidell et al., 1991). Figure 3-2 (FICON 1992) shows an updated form of the curve fit (Finegold, et al., 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the

percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. However, for the evaluation of community noise impacts, the scientific community has endorsed the use of DNL (ANSI 1980; ANSI 1988; USEPA 1972; FICUN 1980; FICON 1992).



Day-Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	90
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Figure 3-2 Response of Communities to Noise; Comparison of Original (Schultz 1978) and Current (Finegold et al. 1994) Curve Fits

The definition of daytime and nighttime periods gives DNL a basic 24-hour definition. It can, however, be applied over periods of multiple days. For application to airbases, DNL is applied as an annual average for the daily operations. In this document, DNL analyses are based on average annual operations for CY 2003 and CY 2013. They are not based on any specific 24-hour day during these calendar years. When the noise exposure of these operations is modeled, the DNL for the community is depicted as a series of contours that connect points of equal value.

3.1.1.1 Affected Environment

Aircraft operations, including flight operations and ground engine-maintenance run-ups, are the primary source of noise at NAS Whidbey Island. These operations are conducted by aircraft stationed at NAS Whidbey Island, including the EA-6B, P-3C/EP-3, C-9, and C-12 aircraft, as well as transient aircraft. During CY 2003, 81,959 annual airfield flight operations were conducted at Ault Field, and 7,682 annual flight operations were conducted at OLF Coupeville. Of all flight operations conducted at Ault Field, approximately 90% operate during the "acoustical" daytime hours (i.e., 7:00 A.M. to 10:00 P.M.), and about 10% operate during "acoustical" nighttime hours (i.e., 10:00 P.M. to 7:00 A.M.) (Wyle Laboratories, Inc. 2004a). Of all flight operations conducted at OLF Coupeville, approximately 83% operate during the "acoustical" daytime hours, and about 17% operate during "acoustical" nighttime hours (Wyle Laboratories, Inc. 2004a). The distribution of aircraft flight operations (arrivals, departures, and pattern operations) and ground engine-maintenance run-ups by aircraft type in CY 2003 is shown in Appendix A. All ground engine-maintenance run-ups occur during the normal working hours of the day.

The noise contours (65-, 70-, and 75-dB DNL) for annual operations conducted in CY 2003 are shown on Figure 3-3 for Ault Field and OLF Coupeville. Table 3-1 shows the population, number of housing units, and acres of land around Ault Field exposed to noise greater than 65 dB DNL, and Table 3-2 shows the population, number of housing units, and acres of land around OLF Coupeville exposed to noise greater than 65 dB DNL. As shown on Figure 3-3, three schools are located within the greater than 65-dB DNL noise zone around Ault Field, of which one school is located within the greater than 75-dB DNL noise zone around Ault Field. No schools or religious institutions are located within the greater than 65-dB DNL noise zone around OLF Coupeville. In addition, portions of Deception Pass State Park, north of Ault Field, are located within the 65- to 70-dB, 70- to 75-dB, and greater than 75-dB DNL noise zones around Ault Field. Portions of Ebey's Landing National Historic Reserve are located within the 65- to 70-dB, 70- to 75-dB, and greater than 75-dB DNL noise zones around OLF Coupeville. Other potential sensitive land uses around Ault Field and OLF Coupeville are discussed in Section 3.3.3.

Table 3-1 Off-Station Land Area, Housing Units, and Estimated Population within the Existing (CY 2003) and Projected (CY 2013) Noise Zones around Ault Field

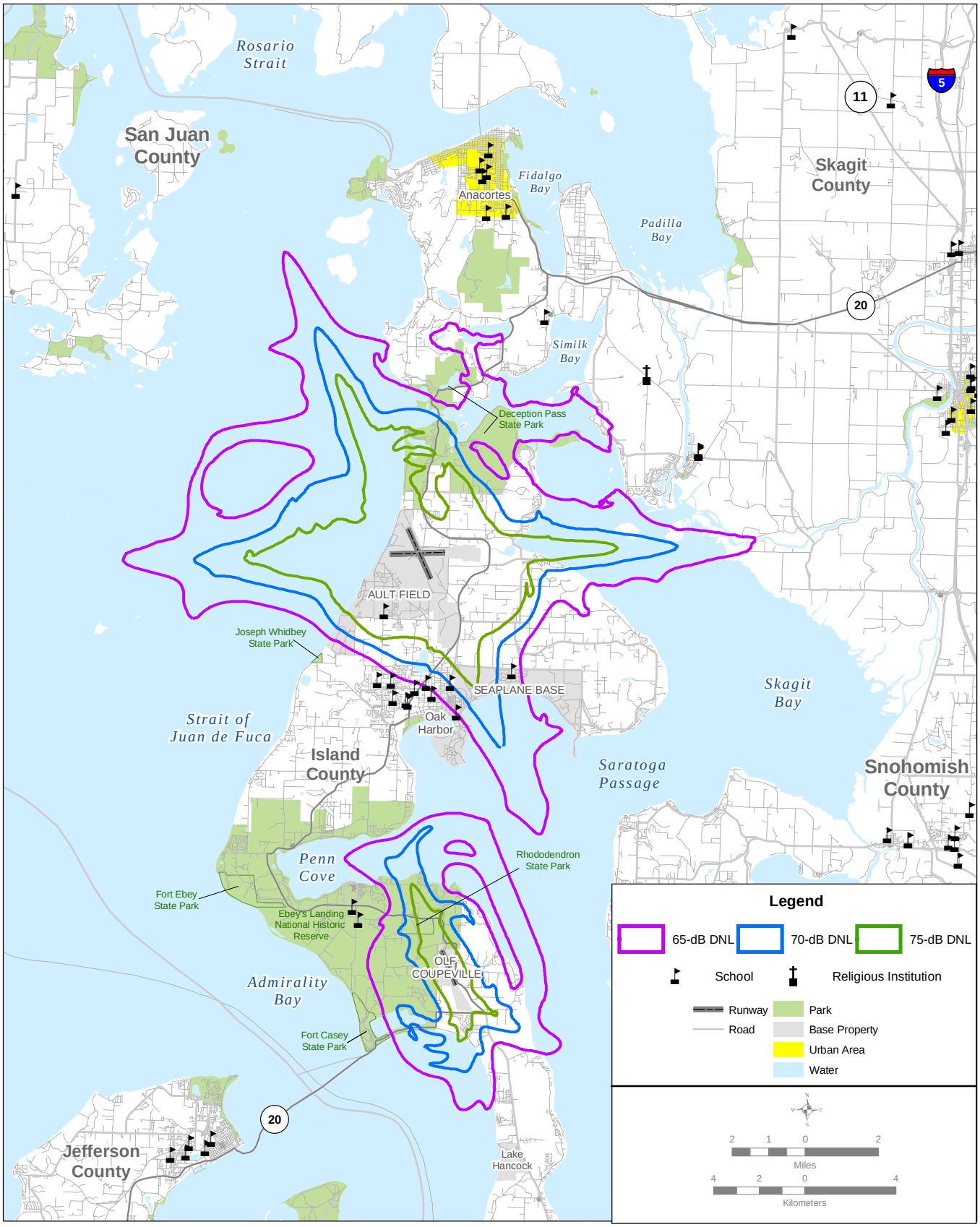
Noise Zone (DNL)	CY 2003	CY 2013	Net Change[1]
Estimated Population (2000)			
65 to 70 dB	5,715	2,982	(48%)
70 to 75 dB	3,612	2,654	(27%)
75 dB or greater	3,015	2,248	(25%)
Total	**12,342**	**7,884**	**(36%)**
Land Area (acres)[2]			
65 to 70 dB	6,085	2,723	(55%)
70 to 75 dB	3,992	4,084	2%
75 dB or greater	6,437	5,164	(20%)
Total	**16,514**	**11,971**	**(28%)**
Housing Units (number)			
65 to 70 dB	2,650	1,271	(52%)
70 to 75 dB	1,477	1,098	(26%)
75 dB or greater	1,286	969	(25%)
Total	**5,413**	**3,338**	**(38%)**

Source: Wyle Laboratories, Inc. 2004a.
[1] Numbers in parentheses denote a decrease.
[2] The area within the noise contours does not include any land within military property or areas that extend over water.

Table 3-2 Off-Station Land Area, Housing Units, and Estimated Population within the Existing (CY 2003) and Projected (CY 2013) Noise Zones around OLF Coupeville

Noise Zone (DNL)	CY 2003	CY 2013	Net Change[1]
Estimated Population (2000)			
65 to 70 dB	1,211	1,196	(1%)
70 to 75 dB	772	589	(24%)
75 dB or greater	407	228	(44%)
Total	**2,390**	**2,013**	**(16%)**
Land Area (acres)[2]			
65 to 70 dB	4,731	4,742	0%
70 to 75 dB	2,695	2,690	0%
75 dB or greater	1,297	536	(59%)
Total	**8,723**	**7,968**	**(9%)**
Housing Units (number)			
65 to 70 dB	626	609	(3%)
70 to 75 dB	385	291	(24%)
75 dB or greater	195	108	(45%)
Total	**1,206**	**1,008**	**(16%)**

Source: Wyle Laboratories, Inc. 2004a.
[1] Numbers in parentheses denote a decrease.
[2] The area within the noise contours does not include any land within military property or areas that extend over water.



Source: Wyle Laboratories Inc. 2004.

Figure 3-3 Existing 2003 DNL Noise Contours for Ault Field and OLF Coupeville

3.1.1.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Modifying the interiors of existing facilities, including minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc., would have a minor impact on the ambient or future noise environment, which is dominated by aircraft operations. Construction-related noise associated with interior modifications would be temporary for the duration of the modification projects, and localized.

Aircraft operations, including flight operations and ground engine-maintenance run-ups, will continue to be the primary source of noise at NAS Whidbey Island following replacement of the EA-6B with the EA-18G. With the decreases in the number of aircraft and personnel associated with replacement of the EA-6B with the EA-18G, the annual number of flight operations at NAS Whidbey Island is projected to decrease, even though the primary types of mission training and readiness requirements for the EA-18G will remain virtually the same as those for the EA-6B. Ground engine-maintenance run-ups also are projected to decrease (an 80% decrease below CY 2003 operations) (Wyle Laboratories, Inc. 2004a) following replacement of the EA-6B with the EA-18G because the newer aircraft will require less maintenance due to the decrease in flight operations and its younger age. Aircraft flight operations of the P-3C/EP-3, C-9, and transient aircraft will remain the same in CY 2013; however, the C-12 has been disestablished and, therefore, those operations are not represented.

During CY 2013, 75,987 annual airfield flight operations will be conducted at Ault Field (a 7% decrease below CY 2003 operations), and 6,120 annual flight operations will be conducted at OLF Coupeville (a 20% decrease below CY 2003 operations) (Wyle Laboratories, Inc. 2004a). The distribution of aircraft flight operations (arrivals, departures, and pattern operations) and ground engine-maintenance run-ups by aircraft type in CY 2013 is shown in Appendix A. The percentage distribution of daytime and nighttime operations will not change following replacement of the EA-6B with the EA-18G.

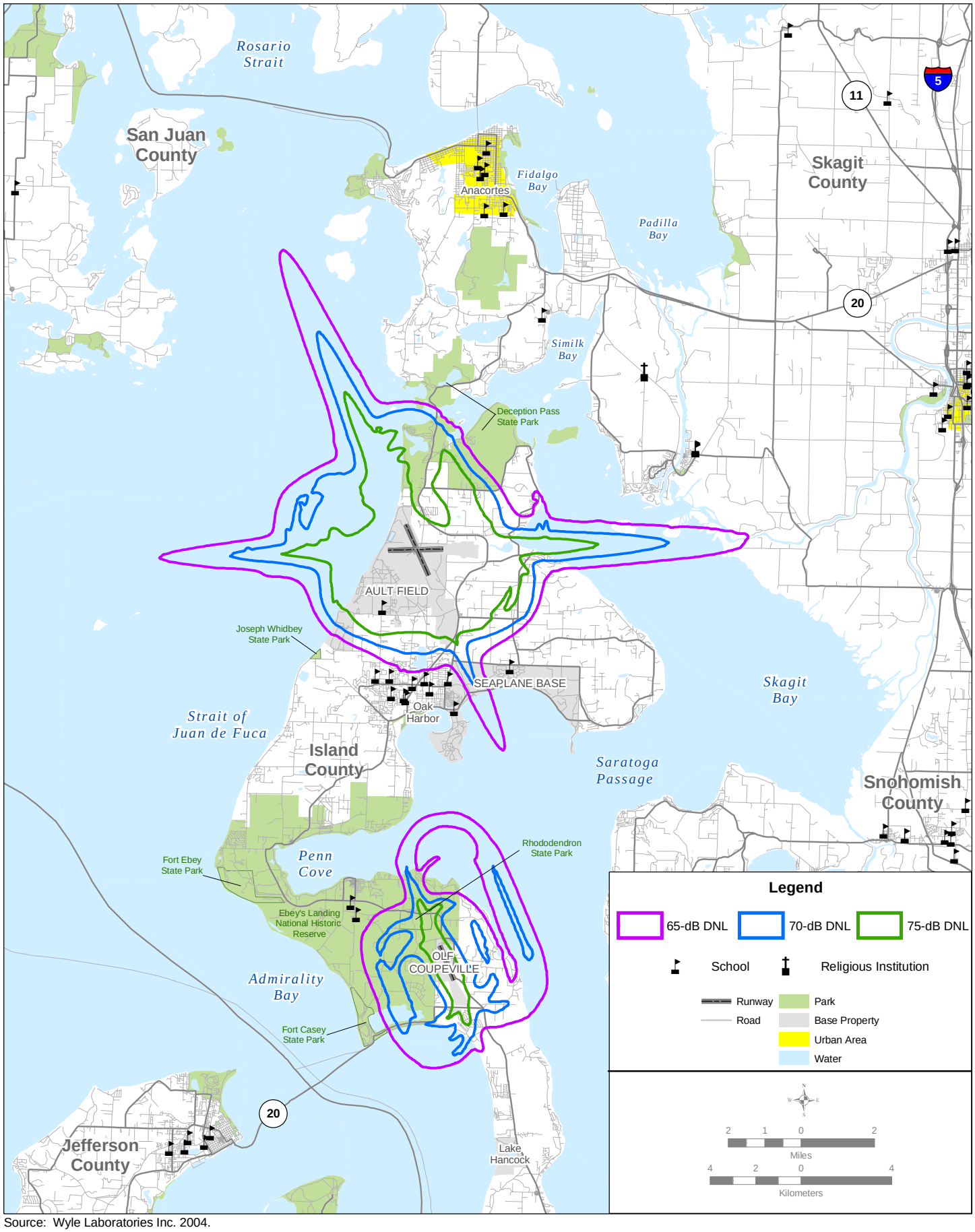
The projected noise contours (65-, 70-, and 75-dB DNL) for annual operations conducted at Ault Field and OLF Coupeville in CY 2013 following replacement of the EA-6B with the EA-18G are shown on Figure 3-4, and a comparison of the CY 2003 and CY 2013 noise contours (65- and 75-dB DNL) is shown on Figure 3-5. Operation of the EA-18G in replacement of the EA-6B results in less noise exposure to the local community. This is primarily attributed to the

better performance of the EA-18G and the reduction in the number of operations. As a newer aircraft, the EA-18G performs better than the EA-6B at lower power settings, which occur nearer the airfield. In addition, the EA-18G has a steeper climb-out rate, and thereby reaches a higher altitude more quickly, which also reduces the noise exposure to the community.

As shown in Table 3-1, there is a 28% reduction in overall land area within the noise contours for Ault Field and a 9% reduction in overall land area within the noise contours for OLF Coupeville between CY 2003 and CY 2013. For Ault Field, most of the reduction occurs between the 65- to 70-dB DNL noise contours. There is a slight increase in land area between the 70- to 75-dB DNL noise contours between CY 2003 and CY 2013 for Ault Field; however, this results from reductions in the areas within higher noise contours near the airfield under CY 2003. Although the overall land area within the greater than 75-dB DNL noise zone around Ault Field decreases, a small portion of land area northeast of Ault Field that was not exposed to the greater than 75-dB DNL noise zone in CY 2003 will be exposed to the greater than 75-dB DNL noise zone in CY 2013. In addition, a small increase in the land area within the 65- to 70-dB DNL noise zone occurs on the west side of Ault Field, within Ebey's Landing National Historic Reserve. These areas are shown on Figure 3-6 and discussed in more detail in Sections 3.3.1, Population and Housing, Section 3.3.3, Land Use, and Section 3.3.4, Cultural Resources. For OLF Coupeville, most of the reduction in land area exposed to aircraft noise occurs within the greater than 75-dB DNL noise contour.

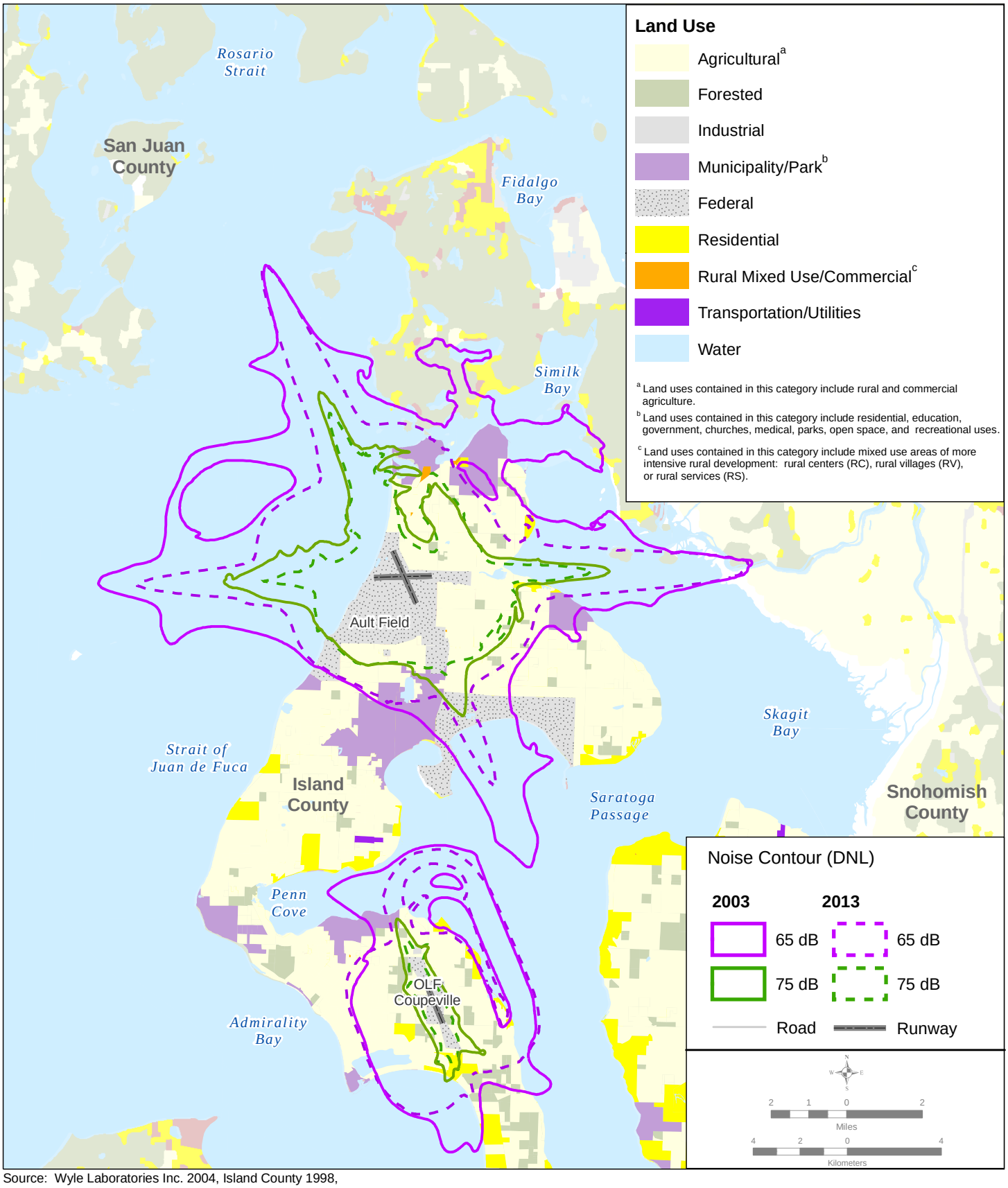
As shown on Figure 3-4, two schools that were located in the greater than 65-dB DNL noise zone around Ault Field are no longer located within the greater than 65-dB DNL noise zone. An overall reduction of land area occurs in the area of Ebey's Landing National Historic Reserve and Deception Pass State Park that are within the 70- to 75-dB and greater than 75-dB DNL noise zones around OLF Coupeville and Ault Field, respectively.

Therefore, given the overall reduction in land area, population, and housing units within the noise contours for Ault Field and OLF Coupeville, the Proposed Action under Alternative 1 would result in no significant adverse impacts.



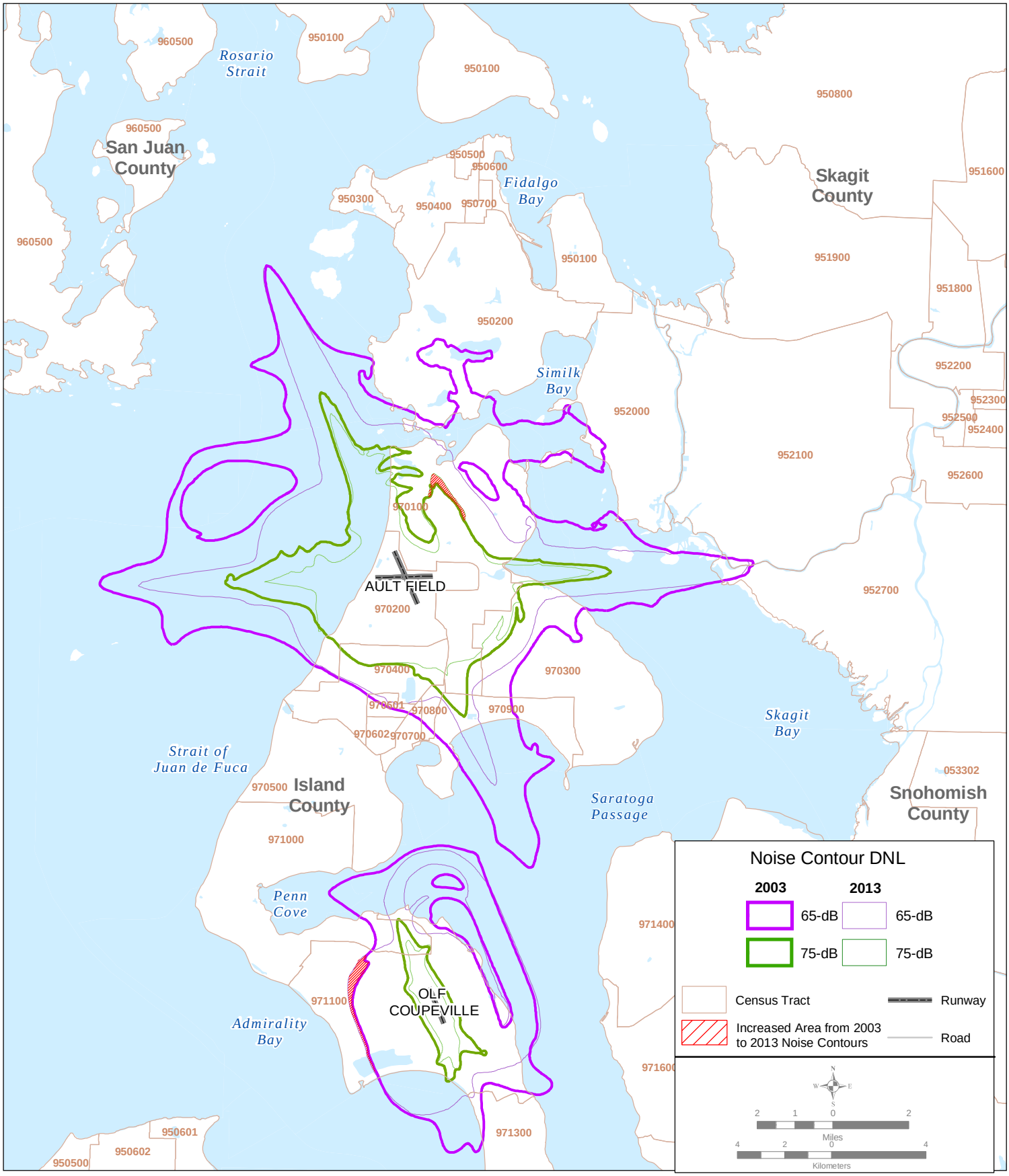
Source: Wyle Laboratories Inc. 2004.

Figure 3-4 Projected 2013 DNL Noise Contours for Ault Field and OLF Coupeville



Source: Wyle Laboratories Inc. 2004, Island County 1998, USGS 1994.

Figure 3-5 Comparison Between Existing 2003 DNL Noise Contours and 2013 Noise Contours Over Land Use



Source: Wyle Laboratories Inc. 2004, Island County 1998, US Census Bureau 2000.

Figure 3-6 Comparison Between Existing 2003 DNL Noise Contours and 2013 Noise Contours with Census Tracts

3.1.1.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Because the projected (CY 2013) aircraft operations will be the same under Alternative 1 and Alternative 2, the environmental consequences discussed under Alternative 1 also will occur under Alternative 2.

In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square-foot hangar addition to Hangar 10. Construction of the hangar addition would result in short-term construction-related noise impacts. Typical noise emission levels for construction equipment are shown in Table 3-3.

Table 3-3 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	88
Delivery Truck	88
Diamond Saw	90
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-Driven Vibro-compactor	76
Hoist	76
Jackhammer (paving breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85
Vibratory Pile Driver/Extractor	89

Source: Patterson et al. 1974.

Noise impacts related to construction are considered minor because they would occur only during the construction of the facility (estimated construction period of 10 months), and would be intermittent during construction, depending on the type of activity. In addition, noise from aircraft operations is the dominant noise at the airfield, and, at sound levels over 100 dB for a single event (Wyle Laboratories, Inc. 2004b), would tend to mask the construction-related noise.

3.1.1.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.1.1.1, Affected Environment.

3.1.2 Air Quality

3.1.2.1 Affected Environment

The Clean Air Act (CAA) designates six pollutants as "criteria pollutants" for which NAAQS have been established to protect public health and welfare. These pollutants include PM_{10}, $PM_{2.5}$, CO, SO_2, NO_2, lead, and ozone. The Washington State Implementation Plan prescribes measures to achieve and maintain "attainment" of NAAQS. Areas that meet the NAAQS for a criteria pollutant are designated as being in "attainment" for that pollutant. Island County is in attainment of the NAAQS for all criteria pollutants, including the new 8-hour ozone standard (Federal Register, April 30, 2004).

The NWAPA is the regional agency responsible for overseeing the state's operating permit program for Island, Skagit, and Whatcom counties. NAS Whidbey Island is the only major source of stationary emissions in Island County. There are other major sources in Skagit and Whatcom counties.

Air quality in Island, Skagit and Whatcom counties is good. Air quality monitors in Whatcom (ozone, PM_{10}, and $PM_{2.5}$), Skagit (ozone), and Snohomish (CO) counties show air quality levels well below the standards (Table 3-4).

Table 3-4 Criteria Pollutant Monitoring Data for Regional Air Quality Around NAS Whidbey Island

Monitoring Station[1]	Pollutant	Averaging Time, data point	Standard	2003 Concentrations				Percent of Standard
				1st Max	2nd Max	3rd Max	4th Max	
Snohomish (Lynnwood)	CO	8-hour, second highest concentration	10 µg/m3	4.5 µg/m3	4.0 µg/m3			40
	CO	1-hour, second highest concentration	40 µg/m3	6.0 µg/m3	5.9 µg/m3			15
Skagit (728 Ranger Station Rd)	Ozone	1-hour, second highest concentration	0.12 ppm	0.072 ppm	0.071 ppm			59
		8-hour, fourth highest concentration	0.08 ppm	0.063 ppm	0.059 ppm	0.058 ppm	0.058 ppm	73
Skagit (Anacortes)	Ozone	1-hour, second highest concentration	0.12 ppm	0.063 ppm	0.061 ppm			51
		8-hour, fourth highest concentration	0.08 ppm	0.056 ppm	0.055 ppm	0.052 ppm	0.05 ppm	63
Whatcom	Ozone	1-hour, second highest concentration	0.12 ppm	0.073 ppm	0.071 ppm			59
		8-hour, fourth highest concentration	0.08 ppm	0.062 ppm	0.058 ppm	0.058 ppm	0.056 ppm	70
Whatcom (Bellingham)	PM10	24-hour average, not to be exceeded more than one day in three years	150 µg/m3	26 µg/m3				17
		Annual mean	50 µg/m3	12 µg/m3				24
Whatcom (Bellingham)	PM2.5	24-hour average, not to be exceeded more than one day in three years	65 µg/m3	19 µg/m3				29
		Annual mean	15 µg/m3	7 µg/m3				47

Source: USEPA 2004a.

[1] Island County does not currently contain any air quality monitors.

Existing Stationary Source Emissions

Stationary source emissions at NAS Whidbey Island are regulated under a Title V Operating Permit approved by the NWAPA in 1999. The stationary sources regulated under the issued permit include aviation gasoline storage tanks; jet engine test cells; painting, cleaning, and repair operations; and boilers, furnaces, and generators. The Title V Operating Permit provides for emissions at levels that will maintain attainment with the State Implementation Plan. Total stationary source emissions reported by NAS Whidbey Island to the NWAPA in 2001 and 2002 are shown in Table 3-5.

Table 3-5 Stationary Source Emissions Reported over the Past Two Years for NAS Whidbey Island under its Title V Operating Permit

	Pollutant (tons per year)				
	CO	NO_X	VOCs	SO_2	PM_{10}
2001	24	26	40	8	24
2002	30	31	38	1	34

Source: NWAPA 2004.

The Proposed Action involves only the jet engine test cell with respect to emissions from stationary sources. Permitted operating conditions for the test cell include calculation and reporting of annual emissions based on EA-6B emission factors and a limit of 825 testing hours per year. Stationary source emissions associated with the EA-6B from the test cell are shown in Table 3-7. Current EA-6B test cell emissions are based on the existing data calculated and reported in accordance with the Title V Operating Permit (Kuenzi 2004) (see Appendix B for calculations).

Existing Mobile Source Emissions

Aircraft engine emissions contain the criteria pollutants PM_{10}, $PM_{2.5}$, CO, SO_2, and NO_2, as well as volatile organic compounds (VOCs), which contribute to the formation of ozone, a criteria pollutant. Other mobile sources include personally owned vehicles (POVs) and aircraft ground support equipment (GSE). Mobile source emissions in attainment areas are not regulated by the state's permitting program, although for planning purposes NWAPA does collect mobile source emission data to compile a partial annual inventory of mobile source emissions.

To set a baseline to evaluate the potential change in mobile source emissions from the Proposed Action, annual mobile source emissions for aircraft operations were estimated for CY 2003 (Table 3-6). Supporting operations data for CY 2003 are provided in Appendix A, and supporting data for the mobile source emissions analysis are provided in Appendix B. Baseline emission factors were provided by the Aircraft Environmental Support Office (AESO), and operations information was obtained from station personnel (Wyle Laboratories, Inc. 2004a). GSE emissions were estimated using emission factors developed by the Navy (U.S. Department of the Navy 2000) and equipment hours of operation data provided by station personnel (Kuenzi 2004). POV emission factors were developed using the mobile emission factor calculation

software “Mobile 6.2” from USEPA and existing population distribution data provided by station personnel (Baldridge 2004).

Table 3-6 Total Annual Mobile Source Emissions (CY 2003)

Type of Operation	Number of Annual Operations	Pollutant (tons per year)				
		CO	NO_x	VOCs	SO_2	PM_{10}
AIRCRAFT OPERATIONS						
EA-6B						
LTO[1]	4,816	135.5	27.1	64.4	2.0	70.0
FCLP and T&G[2]	20,113	29.7	46.8	5.0	2.4	58.6
GCA Box	4,119	12.8	15.3	2.0	0.9	23.0
Maintenance Run-ups[3]		49.1	11.3	20.8	0.8	27.7
Total		**227.1**	**100.5**	**92.2**	**6.1**	**179.3**
P-3						
LTO[1]	8,183	153.4	86.8	100.6	5.5	44.1
FCLP and T&G[2]	6,556	2.3	5.7	1.5	1.5	3.4
GCA Box	4,836	2.7	9.1	1.4	1.4	4.8
Maintenance Run-ups[3]		2.4	2.2	1.8	0.1	0.8
Total		**160.8**	**103.8**	**105.3**	**8.5**	**53.1**
C-9						
LTO[1]	325	5.4	3.0	1.4	0.2	5.4
C-12						
LTO[1]	100	0.25	0.0	0.0	0.0	0.0
Transient (P-3)						
LTO[1]		4.7	2.7	3.1	0.2	1.4
Total Aircraft Mobile Source Emissions		**398.2**	**210.0**	**202.0**	**15.0**	**239.2**
OTHER MOBILE SOURCES						
GSE		**48.5**	**51.7**	**24.4**	**0.0**	**7.9**
POV		**619.6**	**34.3**	**41.6**	**0.9**	**0.9**
Total Mobile Source Emissions		**1,066.3**	**296.0**	**268.0**	**15.9**	**248.0**

[1] Landing and take-off operations (includes various idling modes, taxi, take-off, climb-out, and approach).
[2] FCLP operations are counted as one operation for calculating air emissions from this flight event. FCLP operations are counted as two operations (i.e., a take-off and a landing) by air traffic control operators.
[3] Engine maintenance run-ups that are not conducted in an enclosed facility. See Appendix B for operational data.

3.1.2.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Projected Stationary Source Emissions

Projected stationary source emissions associated with the EA-18G test cell are shown in Table 3-7. These data are based on operating data provided by station personnel applied to the new EA-18G engine emission factors provided by AESO.

Table 3-7 Total Annual Stationary Source (Test Cell) Emissions: EA-6B and EA-18G

	Pollutant (tons per year)				
	CO	NO_x	VOCs	SO_2	PM_{10}
EA-6B	12.24	14.65	4.84	0.64	14.06
EA-18G	18.59	7.31	1.02	0.10	0.32
Net Change[1]	**6.35**	**(7.34)**	**(3.82)**	**(0.53)**	**(13.74)**

[1] Numbers in parentheses denote a decrease.

Under Alternative 1, operation of the test cell is anticipated to emit less VOCs, NO_X, SO_2, and PM_{10} than current operations on an annual basis. CO emissions are anticipated to increase by an estimated 6.35 tons per year over current stationary source operations. Note that this increase is still well below the PSD threshold for a modification to a stationary source. For attainment areas, the PSD threshold for CO is 100 tons per year, meaning that all CO emission increases less than 100 tons per year are deemed not significant enough to degrade regional air quality.

Even through the increase in CO emissions is below the PSD threshold, this increase and the testing of a different engine will require a modification to the NAS Whidbey Island Title V Operating Permit. Given that the anticipated change is less than the CO PSD threshold, such a modification is expected to be granted by the state agency without undue difficulty and is accordingly assumed to be a routine matter. The modification would specify allowable operating conditions for the new engine, providing for air emissions management consistent with existing air quality regulations and intended to maintain the current attainment status. In any case, NAS Whidbey Island will operate the test cell under this Proposed Action only upon receipt of a modified permit. Therefore, the projected increase in stationary source emissions is considered minor and not significant.

Projected Mobile Source Emissions

Mobile source emissions from the EA-18G aircraft were estimated from total annual air operations, the throttle settings used during each operation, and known EA-18G engine emissions factors provided by AESO. Projected emissions from a single landing and take-off operation (LTO) are displayed graphically on Figure 3-7. An average LTO for the EA-18G is anticipated to emit less PM_{10} and SO_2 but more CO, NO_2, and VOCs (hydrocarbons [HC]) with and without use of the afterburner (the EA-6B is not equipped with an afterburner). When estimated on an annual squadron basis, the Proposed Action will result in a decrease in mobile source emissions of PM_{10} and SO_2 and an increase in mobile source emissions of CO, NO_2, and VOCs (Table 3-8). Emissions of $PM_{2.5}$ also will decrease, as these emissions are a component of emissions of PM_{10} emissions.

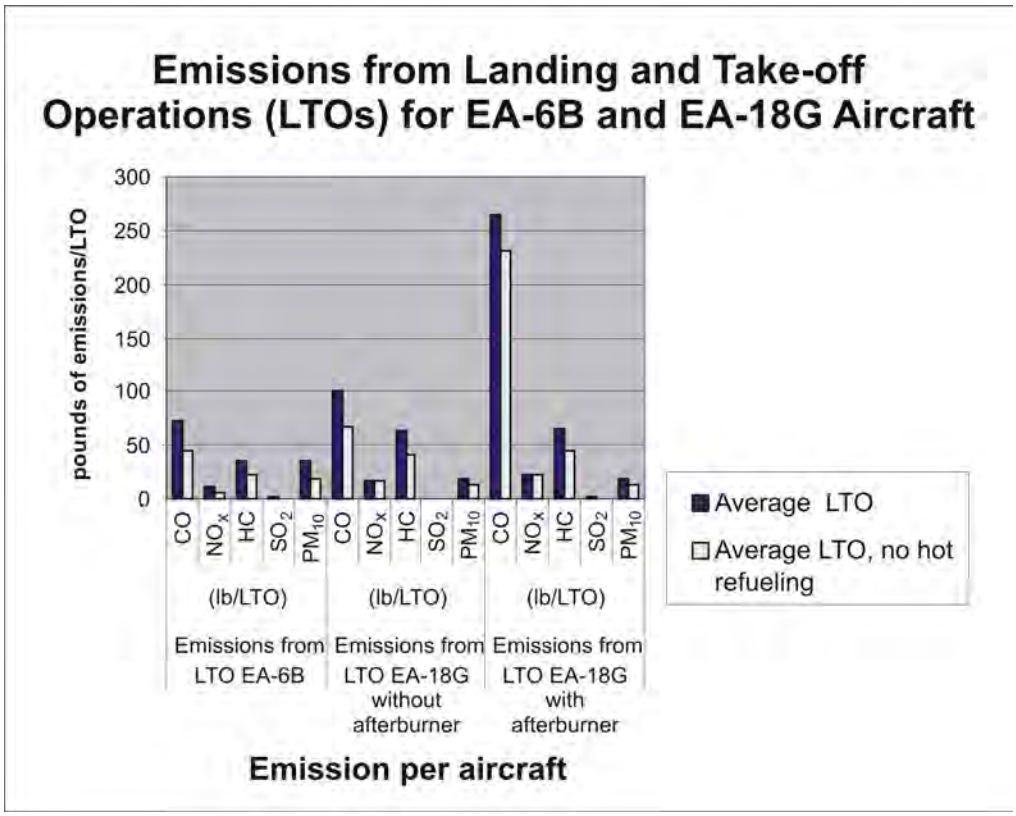


Figure 3-7 Comparison of Emissions of Criteria Pollutants: EA-6B and EA-18G

Projected annual emissions from GSE and POVs are also projected to decrease with replacement of the EA-6B with the EA-18G due to the decrease in number of aircraft and personnel associated with the VAQ squadrons.

Table 3-8 indicates the total projected mobile source emissions for the EA-18G. Note that the bottom row specifies the net change to mobile source emissions.

Table 3-8 Total Annual Mobile Source Emissions (CY 2013)

Type of Operation	Number of Annual Operations	Pollutant (tons per year)				
		CO	NO_x	VOCs	SO_2	PM_{10}
AIRCRAFT OPERATIONS						
EA-18G						
LTO[1]	4,588	486.2	50.8	121.3	1.9	35.3
FCLP and T&G[2]	16,771	3.9	75.6	0.6	1.9	25.5
GCA Box	3,924	1.8	35.4	0.3	0.9	11.9
Maintenance Run-ups[3]		31.6	6.5	7.7	0.3	5.6
Total		**523.5**	**168.3**	**129.9**	**5.0**	**78.3**
P-3						
LTO[1]	8,183	153.4	86.8	100.6	5.5	44.1
FCLP and T&G[2]	6,556	2.3	5.7	1.5	1.5	3.4
GCA Box	4,836	2.7	9.1	1.4	1.4	4.8
Maintenance Run-ups[3]		2.4	2.2	1.8	0.1	0.8
Total		**160.8**	**103.8**	**105.3**	**8.5**	**53.1**
C-9						
LTO[1]	325	5.4	3.0	1.4	0.2	5.4
C-12						
LTO[1]	0	0.0	0.0	0.0	0.0	0.0
Transient (P-3)						
LTO[1]	252	4.7	2.7	3.1	0.2	1.4
Total Aircraft Mobile Source Emissions		**694.4**	**277.8**	**239.7**	**13.9**	**138.2**
OTHER MOBILE SOURCES						
GSE		45.4	45.8	22.4	0.0	7.5
POV		557.5	30.8	37.5	0.8	0.8
Total Mobile Source Emissions		**1,297.3**	**354.4**	**299.6**	**14.7**	**146.5**
Net Change to Mobile Source Emissions[4]		**231.0**	**58.4**	**31.6**	**(1.2)**	**(101.5)**

[1] Landing and take-off operations (includes various idling modes, taxi, take-off, climb-out, and approach).
[2] FCLP operations are counted as one operation for modeling air emissions from this flight event. FCLP operations are counted as two operations (i.e., a take-off and a landing) by air traffic control operators.
[3] Engine maintenance run-ups that are not conducted in an enclosed facility. See Appendix B for operational data.
[4] Numbers in parentheses denote a decrease.

Table 3-8 shows that mobile source emissions are projected to increase from CY 2003 levels for CO, NO_X, and VOCs. The projected increase under this Proposed Action would occur in a large, three-dimensional area at and above NAS Whidbey Island, Island County, and Skagit County. The airspace in which the projected emissions from the new replacement aircraft would occur extends beyond the boundaries of NAS Whidbey Island, its horizontal extent being generally on the order of a county and vertically extending 3,000 feet. Since mobile source emissions in an attainment area are not regulated under the CAA, there are no direct standards on which to compare existing to future conditions to determine levels of significance. However, a comparison can be made between the net change in mobile source emissions under this Proposed Action and all existing mobile source emissions that are generated within the NWAPA jurisdictional area.

The NWAPA region includes Island, Skagit, and Whatcom counties. The projected increase in emissions related to this action is shown to be minor when compared to total mobile source emissions from the region (Table 3-9). Emissions of CO, NO_X and VOCs would increase only about 1% relative to mobile source emissions in the Island County area. When compared to the three-county area, the anticipated change will result in a less than 1% increase in CO, NO_X, and VOCs. Thus, the anticipated changes in mobile source emissions under the Proposed Action are considered insignificant.

Table 3-9 Comparison of Percent Change in Mobile Source Emissions within Island County and the Three-County NWAPA Region

	Emissions (tons per year)				
	CO	NO_X	PM_{10}	SO_2	VOCs
NAS Whidbey Island					
Change in Mobile Source Emissions (CY 2003 to CY 2013)	231.2	58.40	(101.50)	(1.2)	31.5
Total NAS Whidbey Island Mobile Source Emissions (includes POV and GSE)	1,066.2	296.1	247.96	15.8	268.10
% Change in Mobile Source Emissions at NAS Whidbey Island[2]	22%	20%	(41%)	(7.4%)	11.8%
Island County					
Change in Mobile Source Emissions (CY 2003 to CY 2013)	231.2	58.40	(101.5)	(1.2)	31.5

Table 3-9 Comparison of Percent Change in Mobile Source Emissions within Island County and the Three-County NWAPA Region

	Emissions (tons per year)				
	CO	NO_X	PM_{10}	SO_2	VOCs
Total Mobile Source Emissions in Island County[1]	19,690.1	4,881.26	388.3	475.4	2,057.5
% Change in Mobile Source Emissions in Island County[2]	1.2%	1.2%	(26%)	0%	1.5%
NWAPA Region					
Change in Mobile Source Emissions (CY 2003 to CY 2013)	222.4	21.2	(109.0)	(1.7)	27.4
Total Mobile Source Emissions in Skagit, Island, and Whatcom Counties (NWAPA Region)	140,341.23	23,747.8	1,159.4	2,983.4	12,735.5
% Change in Mobile Source Emissions in Skagit, Island, and Whatcom Counties (NWAPA Region) [2]	0.16%	0.25%	(8.71%)	(0.04%)	0.25%

[1] Emission totals provided by NWAPA 2004. Total mobile emissions do not include aircraft emissions; therefore, existing aircraft emissions at NAS Whidbey Island calculated in this analysis are added to the totals provided by NWAPA.

[2] Numbers in parentheses denote a decrease.

3.1.2.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

The environmental consequences discussed under Alternative 1 also would occur under Alternative 2 because the projected (CY 2013) aircraft operations would be the same under Alternative 1 and Alternative 2.

Under Alternative 2, however, additional construction-related emissions would occur with construction of the 20,000-square-foot hangar addition during the first year of implementation of the Proposed Action. Emissions are produced from construction equipment exhaust during site preparation and construction activities (see Appendix B). Fugitive particulate matter is generated during the disturbance and removal of existing structures/obstructions and construction (Table 3-10).

Table 3-10 Total Vehicle Engine Exhaust and Fugitive Particulate Emissions from Construction Activities (CY 2013)

	Pollutant (tons per year)				
	VOCs	NO_x	SO_2	CO	PM_{10}
Grading Equipment	0.03	0.26	0.02	0.06	0.02
Material Hauling	0.04	0.57	0.04	0.12	0.04
Demolition					0.6
Fugitive Emissions					5.57
Total Emissions from Construction	**0.07**	**0.83**	**0.06**	**0.18**	**6.23**

Construction-related emissions are so low in comparison to the NWAPA jurisdictional area loading of criteria pollutants that they are immeasurable when considered on an annualized basis. The estimated length of construction for the type of facility considered in this alternative would be 10 months; thus, these low-level construction-related emissions would occur at this site for only 10 months. This level of effect is considered not significant.

3.1.2.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.1.2.1, Affected Environment.

3.1.3 Hazardous Materials and Waste Management

3.1.3.1 Affected Environment

A variety of hazardous materials are used at NAS Whidbey Island to support the aircraft squadrons, including lubricants and oils, solvents, cleaning compounds, acids, sealants, adhesives, paints and lacquers, paint thinners and removers, and other miscellaneous chemicals used for maintenance and operation of the aircraft and associated facilities (Gonzales 2004a). If not consumed during use, these materials and/or their containers eventually must be disposed of as hazardous waste.

The use of all hazardous materials at NAS Whidbey Island is tracked using the Navy's Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP). The HAZMIN Center is the station's centralized hazardous materials control and management

point from requisition to disposal. CHRIMP requires all hazardous material procurement to be processed through the HAZMIN Center. The HAZMIN Center utilizes a Windows-compliant database management system called Hazardous Substance Management System (HSMS) to track hazardous materials inventory, including their chemical constituents. The tracking begins when a material is ordered and using a bar code system, follows the material and its container through receipt, issue, use, return, reissue, recycling, and disposal. The Navy initiated CHRIMP as a method of controlling hazardous materials procurement and thereby reducing hazardous waste generation and disposal. The facility operates on a just-in-time delivery basis, eliminating the tendency to over-purchase and stockpile materials (Gonzales 2004b).

Prior to procurement and use, all hazardous materials used in a specific workplace must go through an approval process before it can be placed on the activity's Authorized Use List (AUL). The HAZMIN Center will not order a material unless it is approved and placed on the activity AUL. Any new hazardous material needs to be approved by the HAZMIN Center and the environmental, safety, and occupational health organizations on the station (Gonzales 2004b).

After a material is spent and it is determined to be waste, it can either be turned into the HAZMIN Center, as in the case of an empty bar-coded container, or stored temporarily at a hazardous waste accumulation site. Accumulation sites include satellite accumulation areas located near the point of waste generation and <90-day accumulation sites. All waste is eventually transferred to the station's Central Hazardous Waste <90-day Accumulation Facility for processing prior to disposal through the Defense Reutilization and Marketing Office (DRMO) disposal contractor. A numbered hazardous waste profile is generated for each hazardous waste stream. A uniform hazardous waste manifest is prepared by the DRMO contractor and reviewed by the station for completeness and accuracy before scheduled pickup and transfer to a permitted treatment, storage, and disposal facility (TSDF). All waste data, including manifest data, is tracked through a database to ensure that cradle-to-grave tracking requirements are accomplished (Gonzales 2004b).

NAS Whidbey Island is classified under the Resource Conservation and Recovery Act (RCRA) as a large-quantity generator of hazardous waste and can store hazardous waste for less than 90 days without a permit. According to hazardous waste data provided by NAS Whidbey Island, the station generated a total of 208,008 pounds of hazardous waste in 2003, or approximately 1,700 pounds per aircraft (Gonzales 2004a). Further review of waste generation

data by squadron and by the AIMD confirms that the approximate waste generation per EA-6B aircraft averages 1,700 to 1,800 pounds per year (Anderson 2004). Similar waste generation data for NAS Lemoore for 2002 shows that hazardous waste generation is approximately 1,000 pounds per year for the F/A-18 E/F aircraft stationed there and that the characteristics of the hazardous waste managed by NAS Lemoore are the same as those managed by NAS Whidbey Island.

3.1.3.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Operation and maintenance of the EA-18G will not introduce any additional hazardous materials and/or waste streams that cannot be managed by the existing hazardous materials and waste management functions and facilities at NAS Whidbey Island.

For an acquisition program under the DoD, a Programmatic Environment, Safety, and Occupational Health (ESOH) Evaluation (PESHE) must be performed in compliance with DoD Instruction 5000.2, Operation of the Defense Acquisition System. The focus of the PESHE is to appropriately embed ESOH considerations and decision-making into all aspects of the program, including manufacture, test and evaluation, deployment/operation/maintenance, and disposal. Updates and/or changes to the PESHE are incorporated on an annual basis prior to key programmatic milestone reviews.

The initial PESHE for the EA-18G Program was completed in October 2003 and focused on the manufacture of the aircraft (U.S. Department of the Navy 2003). The EA-18G manufacturer, The Boeing Company, will be required to identify hazardous materials used on or for the EA-18G and will provide a status of hazardous material management plan initiatives for eliminating and/or reducing hazardous materials usage. A hazardous material AUL will be developed for the EA-18G and coordinated with the fleet. Because the EA-18G combines two proven systems (i.e., the F/A-18 F airframe and the EA-6B electronic weapons systems), the existing ESOH documentation already in place for the F/A-18 F and EA-6B Improved Capabilities (ICAP) III Program will be utilized for the development of corresponding documentation for the EA-18G (U.S. Department of the Navy 2003).

The F/A-18 E/F, the latest model in the F/A-18 series, is presently stationed at NAS Lemoore. NAS Lemoore has handled the hazardous materials and hazardous waste associated with the operation and maintenance of this aircraft since 1999, when the aircraft first entered the

fleet. Based on a review of the hazardous waste generation report and AUL for Fiscal Year 2002 for NAS Lemoore, the types of chemicals and waste materials associated with operation and maintenance of the F/A-18 E/F aircraft are not substantially different from the types of chemicals and waste materials that NAS Whidbey Island is currently managing under its hazardous materials and hazardous waste management programs. A comparison of hazardous waste generation data indicates that operation and maintenance activities associated with the F/A-18 E/F results in approximately 40% less waste than with the EA-6B. This may be because the F/A-18 E/F airframe is newer and requires less maintenance. In addition, waste streams associated with the operation and maintenance of the ICAP III equipment currently on the EA-6B may result in some of the difference in waste volume. Regardless, NAS Whidbey Island is currently managing hazardous materials and waste associated with operation and maintenance of the ICAP III, and any facilities or functions needed to handle this equipment and its associated materials and waste streams are already in place.

Modifying the interiors of existing facilities, including minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc., would have no impact on the hazardous materials usage or hazardous waste generation at NAS Whidbey Island. These modifications would be completed with minimal quantities, if any, of potentially hazardous materials (e.g., paint, solvents).

3.1.3.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Aircraft maintenance operations would be the same under Alternative 1 and Alternative 2. Therefore, the environmental consequences discussed under Alternative 1 also would occur under Alternative 2. In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square-foot hangar addition to Hangar 10. This hangar addition would be completed with minimal quantities, if any, of potentially hazardous materials (e.g., paint, solvents).

3.1.3.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-

action alternative are represented as no change from the existing conditions described in Section 3.1.3.1, Affected Environment.

3.1.4 Water Quality

3.1.4.1 Affected Environment

NAS Whidbey Island is located in the upper Puget Sound basin, at the eastern end of the Strait of Juan de Fuca. No naturally occurring rivers, lakes, streams, or ponds are present on Ault Field or OLF Coupeville. The original shallow, meandering watercourses that were present on Ault Field have been channelized and straightened into a series of ditches that now comprise the station's storm water conveyance system. These ditches have a total length of approximately 20 miles (EA EST 1996).

Impervious surfaces cover approximately 24% of the land area at Ault Field (Rothboeck 2004). The Clover Valley watershed drains most of this impervious surface, including the runways, taxiways, hangars, auxiliary buildings, and support roadways. A primary surface drainage system conveys water from Ault Field eastward to a large off-site wetland, which in turn drains via a pump system into Dugualla Bay. Other smaller surface ditches, mainly in the southwestern portion of the installation, drain directly into the Strait of Juan de Fuca.

OLF Coupeville does not contain a stream system, nor does water on the installation drain directly into any intermittent or perennial water bodies. The only surface water body at the installation is a drainage ditch along the east side of the runway. This drainage ditch empties into off-site uplands.

NAS Whidbey Island operates under the U.S. Environmental Protection Agency's (EPA's) Stormwater Multi-Sector General Permit (MSGP) Number WAR05A59F. The MSGP applies to industrial facilities and requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). NAS Whidbey Island's SWPPP identifies potential sources of storm water contamination and presents best management practices (BMPs) that are utilized to prevent or minimize pollutant exposure to storm water. Numerous structural BMPs are employed at outdoor industrial and process areas that are exposed to storm water, such as vehicle or aircraft maintenance, wash-down, and fueling areas; outdoor material storage, loading, and unloading areas; and waste disposal areas. In addition, various non-structural BMPs are employed, such as

inspection and maintenance programs; training programs; erosion and sediment control; and spill response, containment, clean-up, and disposal measures.

3.1.4.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Operation and maintenance of the EA-18G will not affect the quality or quantity of storm water discharges to the water conveyance systems.

Use of existing facilities and functions with minor internal facilities modifications to accommodate replacement of the EA-6B with the EA-18G would not result in the construction of new impervious surfaces. Therefore, there would be no increase in the volume of storm water runoff at the installation. NAS Whidbey Island would continue to enforce the station's SWPPP for control of storm water runoff from aircraft operation and maintenance areas (i.e., the flight line, aircraft refueling area, vehicle maintenance areas, and wash-down areas). Operation and maintenance of the EA-18G will use existing aircraft operation and maintenance areas. Thus, the Proposed Action would not introduce any new or additional sources of pollutants to the storm water conveyance system. There would be no significant impacts to water quality with implementation of this alternative.

3.1.4.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Aircraft flight and maintenance operations would be the same under Alternative 1 and Alternative 2. Therefore, the environmental consequences discussed under Alternative 1 also would occur under Alternative 2. In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square foot hangar addition to Hangar 10.

Under Alternative 2, construction of a hangar addition could result in the introduction of sediments, particulates, and various minor pollutants associated with construction activities into the storm water conveyance system. The flight line adjacent to the existing hangars is already developed as impervious surface (i.e., tarmac) and no additional impervious surface would be created that would increase the amount of storm water runoff.

To avoid or minimize water quality impacts, NAS Whidbey Island will prepare a storm water management plan that will be implemented during the construction period of any construction contract. Examples of storm water management practices to be utilized include placement of

erosion-control devices around construction areas and installation of oil/grease basins, where necessary. Consequently, there would be no significant impacts to water quality with implementation of this alternative.

3.1.4.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.1.4.1, Affected Environment.

3.2 Biological Factors

3.2.1 Wildlife

3.2.1.1 Affected Environment

NAS Whidbey Island prepared an Integrated Natural Resources Management Plan (INRMP) in 1996 (EA EST 1996) in compliance with DoD Instruction 4715.3 and the Sikes Act (16 USC 670a, *et seq*.). The INRMP is a management tool to restore, protect, preserve, and properly use natural resources within the air station that are compatible with, and in support of, the military mission. Unless otherwise noted, the information in the following section was obtained from the INRMP.

Grasslands cover 1,956 acres, or 46% of the total land area, at Ault Field and are the dominant habitat. The grasslands comprise open fields and agricultural lease areas and include native and exotic grasses, grains, and annual crops. This habitat does not support a high diversity or abundance of wildlife due to the lack of structural diversity in the vegetation community. Wildlife that would be present in the grassland habitat at Ault Field includes migratory waterfowl, neotropical migratory songbirds and raptors, small burrowing mammals, and reptiles. Northern harrier (*Circus cyaneus*) are known to nest in undisturbed grasslands near the runway.

Twenty-one additional habitat types occur at Ault Field, including a variety of upland forested and marine communities. However, most of these habitats have been significantly fragmented by development of the airfield. Several forest stands are scattered throughout Ault

Field. Common wildlife using the forested habitat includes black-tailed deer (*Odocoileus hemionus columbianus*), cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), garter snake (*Thamnophis* spp.), salamanders (*Ambystoma* spp.), frogs (*Rana* spp.), and numerous species of birds. Marine habitats are located along and adjacent to the western boundary of Ault Field and comprise intertidal and subtidal areas. Numerous marine fishes, terrestrial and aquatic mammals, and invertebrates occur on beaches and in adjacent waters associated with these habitats. Cormorants (*Phalacrocorax* sp.), loons (*Gavia* sp.), grebes (*Podiceps* sp.), and various species of diving ducks also are common year-round and/or are seasonal residents of the marine habitats. Harbor seals (*Phoca vitulina*), river otters (*Lontra canadensis*), and California sea lions (*Zalophus californianus*) are known to feed in the waters near Ault Field and occasionally use beaches on the installation as haul-out sites.

The highest diversity of wildlife species at Ault Field occurs in the southwest portion of the installation in the vicinity of Rocky Point. Species diversity is highest in this area due to the number and contiguous nature of habitat types present, including stands of mature forest, coastal bluffs, beach strand, native dune vegetation, and a large freshwater wetland. The freshwater wetland has been identified by the Washington Department of Natural Resources (WDNR) as a significant habitat for neotropical migratory birds. In addition, the forested coastal area near Rocky Point supports a great blue heron (*Ardea herodias*) rookery. An additional nesting colony of great blue herons occurs near the fenceline of Ault Field, in the vicinity of Charles Porter Avenue (Guggenmos 2004). Herons from the rookeries have been observed foraging at Ault Field in drainage ditches, wetlands, and nearshore areas. The great blue heron population is monitored and protected at NAS Whidbey Island based on the rarity of the rookery and the heron's status as a state-listed monitor species.

Biological diversity at OLF Coupeville is comparatively lower than at Ault Field due to the extensive area of grassland that covers 454 acres (or 67% of the total land area) at the installation. This lack of structural diversity in the vegetation community habitat does not support diverse or abundant wildlife populations. The grasslands include areas managed around the runway to control the growth of woody vegetation, as well as cultivated fields of barley, winter wheat, oats, and peas.

Forested areas comprise much of the remaining habitat at OLF Coupeville. Forestlands occur at the north and south ends of the installation and are mainly moist to dry coniferous forests. The forested areas are contiguous to more extensive off-site forestlands.

Wildlife species that may occur in the grassland and forested habitats at OLF Coupeville include the northern alligator lizard (*Elgaria coerulea*), Puget Sound garter snake (*Thamnophis sirtalis pickeringii),* northwestern garter snake (*Thamnophis ordinoides*), black-tailed deer*,* coyote, red fox (*Vulpes vulpes*), least weasel (*Mustela nivalis*), cottontail rabbit, small burrowing mammals, and numerous species of birds. The coniferous forest at the north end of the installation has been identified by the WDNR as a significant habitat for neotropical migratory birds. This habitat is used as a breeding area by a number of neotropical migratory songbirds, including the olive-sided flycatcher (*Contopus borealis*), solitary vireo (*Vireo solitarius*), Townsend's warbler (*Dendroica townsendi*), and western tanager (*Piranga ludoviciana*).

The presence of resident and migratory birds creates a bird-aircraft strike hazard (BASH) risk at NAS Whidbey Island. The greatest risk occurs at Ault Field due to the presence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways, all of which serve as habitat attractants to numerous bird species. NAS Whidbey Island has prepared a BASH plan to reduce the potential for collisions between aircraft and birds or other animals. The BASH plan prescribes an ongoing process that involves the distribution of information and active and passive measures to control how birds use the critical areas around the airfield. Methods outlined in the plan to reduce BASH hazards at Ault Field and OLF Coupeville include habitat management, bird dispersal and depredation, and bird avoidance (U.S. Department of the Navy 2001).

In addition, aircrews are trained to be aware of indications for BASH potential and in procedures to avoid potential BASH incidents. The BASH plan also includes an outline of emergency actions following a bird-aircraft strike incident and the post-flight follow-up and reporting procedures.

3.2.1.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Implementation of the Proposed Action will have no significant direct or indirect impacts on wildlife species or habitats at NAS Whidbey Island. The environmental consequences to wildlife associated with maintenance and operation of the EA-18G aircraft are evaluated below.

Use of existing facilities and functions with minor internal facilities modifications to accommodate replacement of the EA-6B with the EA-18G would have no significant impact on wildlife at NAS Whidbey Island, since none of the internal facilities modifications would directly or indirectly affect wildlife habitats.

As discussed in Section 3.1.4.2, the process of maintaining the EA-18G aircraft will not result in an increase in point or non-point source pollution, or affect the quantity and quality of storm water runoff. Therefore, the Proposed Action will have no effect on the aquatic habitats within and adjacent to Ault Field and OLF Coupeville.

The effects of aircraft noise on wildlife have been examined in a variety of studies and reviews over the last 35 years. Overall, the literature suggests that species differ in their responses to aircraft noise (Manci et al. 1988). The following is a brief summary of studies on various species and species groups that are either present or related to those that are present in the vicinity of NAS Whidbey Island.

Lamp (1989) found that responses of mule deer to overflights at NAS Fallon, Nevada, were temporary behavioral changes and minor changes in winter habitat use. Weisenberger et al. (1996) suggested that mule deer habituated to low-level aircraft noise with increased exposure. In a summary by the National Parks Service (1994) on the effects of noise on marine mammals, it was determined that gray whales and harbor porpoises showed no outward behavioral response to aircraft noise or overflights. Other anthropogenic noises in the marine environment from ships and pleasure craft may have more of an effect on marine mammals than aircraft noise (U.S. Air Force 2000).

High-noise events (e.g., a low-level aircraft overflight) may cause birds to engage in escape or avoidance behaviors, such as flushing from perches or nests (Ellis et al. 1991). Several studies on nesting raptors have indicated that birds become habituated to aircraft overflights and that long-term reproductive success is not affected (Grubb and King 1991; Ellis et al. 1991). A study by Grubb and King (1991) on the reactions of bald eagles (*Haliaeetus leucocephalus*) to human disturbances showed that pedestrians and helicopters elicited far greater responses than aircraft. Ellis et al. (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 100 meters, rather than the noise level. Black et al. (1984) studied the effects of low-altitude (less than 500 feet above ground level) military training flights with sound levels ranging from 55 to 100 dBA on wading bird colonies (i.e.,

great egret, snowy egret, tricolored heron, and little blue heron). This study concluded that the reproductive activity was independent of aircraft overflights.

As discussed in Section 3.2.1.1, numerous species of wildlife occur at Ault Field and OLF Coupeville, despite the active use of the airfields for military training activities. The following operational and functional changes associated with the Proposed Action were considered in evaluating the potential for adverse effects on wildlife:

- There will be a 14% decrease in the annual number of flight operations at Ault Field and OLF Coupeville;
- There will be no change in the type, location, or current ratio of daytime and nighttime operations at Ault Field and OLF Coupeville;
- There will be no change in the number or type of flight operations within designated SUA or in the low-altitude MTRs currently used by EA-6B squadrons; and
- The land area within the 65-, 70-, and 75-dB DNL noise contours around Ault Field and OLF Coupeville will decrease by 28% and 9%, respectively.

These operational and functional changes associated with the Proposed Action will have no adverse effects on wildlife. In addition, no aspect of the Proposed Action will create attractants that would have the potential to increase the concentrations of birds. Therefore, considering the decrease in annual operations and utilization of existing flight tracks, no increase in the BASH risk will occur at Ault Field or OLF Coupeville.

3.2.1.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Aircraft flight and maintenance operations would be the same under Alternative 1 and Alternative 2. Therefore, the environmental consequences discussed under Alternative 1 also would occur under Alternative 2. In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square-foot hangar addition to Hangar 10.

Construction of the hangar addition under Alternative 2 would have no direct effects on wildlife, since the addition would be constructed on an existing impervious surface that provides no wildlife habitat. Indirect disturbances to wildlife utilizing peripheral areas as a result of construction noise would be minor and limited to the duration of the construction activity.

3.2.1.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.2.1.1, Affected Environment.

3.2.2 Threatened and Endangered Species

3.2.2.1 Affected Environment

The Endangered Species Act (ESA) and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. The Department of the Navy ensures that consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a threatened or endangered species.

The United States Fish and Wildlife Service (USFWS) and Washington Department of Fish and Wildlife (WDFW) are both sources of information regarding the presence of threatened and endangered species in the vicinity of Ault Field and OLF Coupeville. Information on the presence of listed threatened and endangered marine species in the coastal waters bordering Ault Field was obtained by reviewing the National Oceanic and Atmospheric Administration, Fisheries, (NOAA Fisheries) *Endangered and Threatened Marine Mammals and Sea Turtles That May Occur in the Puget Sound* (NOAA Fisheries 2004a) and *Endangered Species Act Status of West Coast Salmon and Steelhead* (NOAA Fisheries 2004b). Table 3-11 lists the species identified as a result of these reviews, as well as the species' current protection status. Federally-listed threatened and endangered species occurring within or in proximity to the boundaries of Ault Field and OLF Coupeville include the bald eagle, bull trout (*Salvelinus confluentus*), chinook salmon (*Oncorhunchus tshawytscha*), marbled murrelet (*Brachyramphus marmoratus*), Steller sea lion (*Eumetopias jubata*), humpback whale (*Megaptera novaengliae*), leatherback sea turtle (*Dermochelys coriacea*), and golden paintbrush (*Castilleja levisecta*) (Berg 2004; Guggenmos 2004; NOAA Fisheries 2004a,b; USFWS 2004).

Table 3-11 Federally Listed Threatened and Endangered Species at or in the Vicinity of Ault Field and OLF Coupeville

Common Name	Scientific Name	Status
Bald eagle	*Haliaeetus leucocephalus*	FT
Bull trout	*Salvelinus confluentus*	FT
Chinook salmon	*Oncorhunchus tshawytscha*	FT
Marbled murrelet	*Brachyramphus marmoratus*	FT
Steller sea lion	*Eumetopias jubata*	FT
Humpback whale	*Megaptera novaengliae*	FE
Leatherback sea turtle	*Dermochelys coriacea*	FE
Golden paintbrush	*Castilleja levisecta*	FT

Source: Berg 2004; Guggenmos 2004; NOAA Fisheries 2004a, b; USFWS 2004.

Status Codes:

FE = Federal Endangered.
FT = Federal Threatened.

One bald eagle nest site is known to occur at Ault Field along the coastline at Rocky Point (U.S. Department of the Navy 2004c). Six additional nest sites are located in proximity to the coastline within 1.5 miles of the north and south boundaries of Ault Field (Guggenmos 2004). A detailed study completed in 1996 (EDAW 1996) found that eagles use most of the Ault Field shoreline bordering the Strait of Juan de Fuca. Five areas of concentrated bald eagle use were identified at Ault Field: the area immediately surrounding Rocky Point; the point north of Cliffside Park; the 1 mile of shoreline adjacent to the sewage treatment pond; the pilings/approach lights on and just offshore from the approach (northwest) end of Runway 13; and the area along the northern boundary of Ault Field near the North Gate. The results of the 1996 study were incorporated into a Bald Eagle Management Plan that is used by NAS Whidbey Island to ensure that base operations and land uses are compatible with protecting and enhancing bald eagle populations and their habitat.

No bald eagle nest sites are present at OLF Coupeville. Although at least seven nest sites are located within 4 miles of the installation (Guggenmos 2004), eagle use of OLF Coupeville is believed to be infrequent (EA EST 1996).

Adult and sub-adult bull trout and chinook salmon occur in the marine waters adjacent to Ault Field. Chinook salmon have been documented along the shoreline at the north end of Whidbey Island (WSCC 2004). There are no streams of sufficient size or flow at Ault Field or

OLF Coupeville to provide spawning or rearing habitat for adult and juvenile life stages of bull trout and chinook salmon.

Marbled murrelets typically nest in old-growth coniferous forests in proximity to coastal areas. Only small patches of this habitat type occur at NAS Whidbey Island, none of which have previously been identified as supporting marbled murrelet nesting activity (EA EST 1996). In addition, no marbled murrelet occupancy sites are currently known to be present at Ault Field or OLF Coupeville, according to recent data obtained from the WDFW (Guggenmos 2004). This species forages in the inshore marine environment and has been observed foraging in the waters off Ault Field (EA EST 1996).

Steller sea lions occur in the inland marine waters of Washington and have occasionally been observed in Saratoga Passage on the east side of Whidbey Island. They are most commonly seen in Washington during the winter and spring while resting on remote beaches, rocks, or docks (EA EST 1996). A known rest, or haul-out, site is located north of Whidbey Island on Sucia Island, which is part of the San Juan Islands complex (NOAA 2004). No significant haul-out sites for this species are known to exist on Whidbey Island (EA EST 1996).

Humpback whales and leatherback sea turtles occur seasonally off the Washington coast but very rarely enter Washington's inland marine waters (NOAA 2004). Therefore, the potential occurrence of either species in the vicinity of Whidbey Island would be infrequent at best.

Golden paintbrush occurs in native open grasslands. Many of the sites where this species has been documented as occurring are generally flat and at elevations below 330 feet (Gamon et al. 2000). A population of golden paintbrush occurs at NAS Whidbey Island on Forbes Point, which is located at the southwest end of Seaplane Base. The WDNR completed a threatened and endangered plant survey at NAS Whidbey Island in 1994 and 1995 and did not identify any populations or individual occurrences of golden paintbrush at Ault Field or OLF Coupeville (EA EST 1996).

3.2.2.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Environmental consequences to threatened and endangered species associated with maintenance and operation of the EA-18G aircraft are discussed below.

The internal facility modifications planned in support of the Proposed Action would have no effect on any of the federally listed threatened and endangered wildlife species occurring within

or in proximity to Ault Field and OLF Coupeville. In addition, the Proposed Action will have no effect on the golden paintbrush, since no populations of this species are known to occur at Ault Field and OLF Coupeville and no ground-disturbing activities are planned as part of the action.

As discussed in Section 3.1.4.2, the process of maintaining the EA-18G aircraft will not result in an increase in point or non-point source pollution, or effect the quality of storm water runoff. Therefore, the Proposed Action will have no effect on aquatic habitats at or in proximity to Ault Field and OLF Coupeville that are potentially used by the federally listed bull trout, chinook salmon, marbled murrelet, steller sea lion, humpback whale, and leatherback sea turtle.

As discussed in Section 3.2.1.2, information from a variety of studies and reviews indicates that wildlife species differ in their responses to aircraft noise. The following operational and functional changes associated with the Proposed Action were considered in evaluating the potential for adverse effects on threatened and endangered species as a result of operation of the EA-18G aircraft:

- There will be a 14% decrease in the annual number of flight operations at Ault Field and OLF Coupeville;
- There will be no change in the type, location, or current ratio of daytime and nighttime operations at Ault Field and OLF Coupeville;
- There will be no change in the number or type of flight operations within designated SUA or in the low-altitude MTRs currently used by EA-6B squadrons; and
- The land area within the greater than 65-dB DNL noise contour around Ault Field and OLF Coupeville will decrease by 28% and 9%, respectively.

These operational and functional changes associated with the Proposed Action will have no effect on the bald eagle, bull trout, chinook salmon, marbled murrelet, steller sea lion, humpback whale, and leatherback sea turtle.

3.2.2.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Aircraft flight and maintenance operations would be the same under Alternative 1 and Alternative 2. Therefore, the environmental consequences discussed under Alternative 1 also

would occur under Alternative 2. In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square-foot hangar addition to Hangar 10.

Construction of a hangar addition would have no effect on federally protected threatened and endangered species present at NAS Whidbey Island or in the surrounding areas. The new hangar module would be located adjacent to Hangar 10, on currently developed land along the flight line. This is not suitable habitat for any of the federally protected species listed as potentially occurring at or in the vicinity of NAS Whidbey Island.

3.2.2.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.2.2.1, Affected Environment.

3.3 Socioeconomic Factors

3.3.1 Population and Housing

3.3.1.1 Affected Environment

In 2003, the average population of NAS Whidbey Island was 10,780 military and civilian personnel. The largest tenant command stationed at NAS Whidbey Island is the Commander Electronic Attack Wing Pacific (CVWP) and associated squadrons (VAQ). Other major tenants include the Commander Patrol and Reconnaissance Wing Ten (CPRW – 10), which is responsible for training and support of assigned maritime patrol (VP) and reconnaissance squadrons (VQ), Naval Air Reserve Whidbey Island; the Marine Air Training Support Group 53; and Naval Hospital Oak Harbor. More than 50 other tenant commands also are located at NAS Whidbey Island.

As shown for the past 10 years, the average annual population at NAS Whidbey Island fluctuates from year to year (Table 3-12). The population declined annually from 1993 to 1999, reaching a 10-year low of 9,442 in 1999, a nearly 10% decrease below the 1993 population. Most of the population decrease occurred in the military sector. In 2000, both the military and the civilian population began to increase, such that the population in 2003 was the highest it had

been in the past 10 years, a 14% growth since 1999, when the population was the lowest it had been in the past 10 years.

Table 3-12 Average Annual Populations at NAS Whidbey Island between 1993 and 2003

Year	Military Personnel	Civilian Personnel	Total Workforce	% Change in Annual Average Population[1]
1993	8,362	2,022	10,384	
1994	8,261	2,080	10,341	(<1)
1995	8,062	2,151	10,213	(1)
1996	7,995	2,211	10,206	(<1)
1997	7,795	2,191	9,986	(2)
1998	7,630	2,067	9,697	(<1)
1999	7,460	1,982	9,442[a]	(3)
2000	7,771	2,041	9,812	4
2001	7,924	2,123	10,047	2
2002	8,339	2,221	10,560	5
2003	8,478	2,302	10,780	2
% change between lowest and highest average annual workforce population between 1993 and 2003				**14**

Source: Baldridge 2004.

[1] Numbers in parentheses denote a decrease; < means change is less than 1%.
[a] Lowest total workforce population over the 10-year period.
[b] Highest total workforce population over the 10-year period.

The Navy provides 1,552 military family housing units and 1,581 bachelor housing units for military personnel stationed at NAS Whidbey Island. In 2003-2004, on-station housing accommodated approximately 35% of the military families stationed at NAS Whidbey Island (17 units were unoccupied) and approximately 46% of the bachelor enlisted and officers stationed there (SAIC 2004). The remaining military personnel rent or own housing in the local community. In December 2004, the Navy's military housing is expected to be operated under a public-private partnership, continuing to support housing for military personnel stationed at NAS Whidbey Island (Baker-Beste 2004).

Approximately 85% of the personnel stationed or employed at NAS Whidbey Island reside in Island County, including those that reside in military housing (Baldridge 2004). Most personnel are concentrated in the Oak Harbor area. Smaller proportions live further distant in Island and Skagit counties (Table 3-13).

Table 3-13 Residential Location of Personnel Stationed and Employed at NAS Whidbey Island

County/Municipality	% of Personnel
Island County	
NAS Whidbey Island	37.0
Oak Harbor	44.6
Coupeville	3.7
Subtotal	**85.3**
Skagit County	
Anacortes	4.8
Mount Vernon	3.2
Camano Island/Stanwood[1]	2.3
Burlington	1.6
Sedro-Woolley	1.4
Subtotal	**13.3**
Other (municipalities each with < 1%)	1.4
Total	**100**

Source: Baldridge 2004.

[1] Personnel residing in Camano Island actually reside in Island County, whereas personnel residing in Stanwood reside in Skagit County.

According to the 2000 census, Island County had a population of 71,558 (Table 3-14), an increase of 19% over the 1990 census. The Washington Office of Financial Management develops projections for counties in the State of Washington based upon and in accordance with the Washington State Growth Management Act. Between 2000 and 2010, Island County's population is projected to increase between 2.0% (est. pop. 72,988) and 23.4% (est. pop. 88,312). The Island County Comprehensive Plan has utilized the high population growth estimate in its long-range plan, based on an analysis of building permit activity on Whidbey and Camano Islands from 1990 through 1996 (Board of Island County Commissioners et al. 1998).

Table 3-14 Regional Population (1990 and 2000)

	1990 Population	2000 Population	% Change 1990 to 2000
Island County	60,195	71,558	19
City of Oak Harbor	17,176	19,905	16
Coupeville	1,377	1,723	25

Source: U.S. Bureau of the Census 2000.

Table 3-15 provides the demographic and income data for the populations of Island County, Oak Harbor, and Coupeville.

Census data indicate the presence of minority populations within the area affected by the proposed action. Approximately 13% of Island County's population is non-white, and 4% of Island County's population is Hispanic. The percentages of minority populations in Oak Harbor and Coupeville are, respectively, higher and lower than the county average (Table 3-15). Approximately 7% of the households in Island County are considered low-income (i.e., households with incomes below poverty level) (U.S. Bureau of the Census 2000). As indicated by median household and per capita income in 1999, there is a greater density of households with lower incomes in Oak Harbor and Coupeville than in Island County as a whole.

Table 3-15 Total Persons, by Race and Ethnic Origin, for Island County, Oak Harbor, and Coupeville

	Population in Island County	% of Total Population	Population in Oak Harbor	% of Total Population	Population in Coupeville	% of Total Population
Race						
White Alone	62,333	87.1	14,655	73.6	1,566	90.1
Non-White	9,225	12.9	5,250	26.4	172	9.9
Total	**71,558**	**100**	**19,905**	**100**	**1,738**	**100**
Ethnicity						
Non-Hispanic or Latino	68,597	95.9	18,616	93.5	1,645	94.6
Hispanic or Latino	2,961	4.1	1,289	6.5	93	5.4
Total	**71,558**	**100**	**19,905**	**100**	**1,738**	**100**
Income						
Median Household Income in 1999	$45,513	NA	$36,641	NA	$33,938	NA
Per Capita Income in 1999	$21,472	NA	$16,830	NA	$18,720	NA

Source: U.S. Bureau of the Census 2000.

Environmental justice has been defined by various organizations. The USEPA's Office of Environmental Justice offers the following definition:

> "The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from

industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies" (USEPA 2004b).

3.3.1.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Modifying the interiors of existing facilities, including minor changes to room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc., would have no impact on population or housing because these modifications would not result in any changes to on-station or regional population or the availability of housing.

As stated in Section 1, the effect of replacing the EA-6B with the EA-18G is an overall decrease in the number of Electronic Attack (VAQ) aircraft and associated personnel stationed at NAS Whidbey Island. This reduction in personnel will have minor impacts on the on-station population and the regional population since: (1) no reduction in civilian personnel is projected to occur; and (2) military personnel currently assigned to support the EA-6B will be reassigned. Specifically, of the total of 3,163 military personnel currently supporting the EA-6B squadrons, 2,057 (65%) will be transitioned to the EA-18G squadrons. About 1,106 military personnel currently serving in support of the VAQ squadrons (including the expeditionary squadrons) at NAS Whidbey Island will be reassigned to other activities at NAS Whidbey Island or elsewhere in the Navy.

For purposes of this analysis only, it is assumed that these 1,106 military personnel and their dependents will be reassigned from NAS Whidbey Island to Naval installations outside the local area. However, the reduction in personnel associated with the VAQ squadrons will occur gradually over a 6-year period (2008 through 2013) as the EA-6B is replaced with the EA-18G. As shown in Table 1-2, the VAQ squadron composition will change from 164 enlisted and 28 officers for each EA-6B squadron to 161 enlisted and 21 officers for each EA-18G squadron. Assuming two squadrons are affected each year, the total change in personnel (20 military personnel) will be less than 1% of the total 2003 on-station population. The largest change will occur with the disestablishment of the expeditionary squadrons. Assuming two expeditionary squadrons will be affected per year, the total change in personnel (384 military personnel) will be approximately 4% of the total 2003 on-station personnel over two years. The annual reduction in personnel during the transition period will be within normal annual population fluctuations at the air station, as shown in Table 3-12. In addition, some of the 1,106 military personnel may be

reassigned to other functions at NAS Whidbey Island, especially as individuals within the on-station population retire or relocate.

The regional population will be affected by the replacement of the EA-6B with the EA-18G when and if the military personnel reassigned from the VAQ squadrons and their dependents (i.e., spouses and children) leave the local area. The average number of dependents for military personnel stationed at NAS Whidbey Island is 1.4 (Baldridge 2004). Therefore, the reduction of 1,106 personnel from NAS Whidbey Island will result in a regional population loss of 2,654 persons (1,106 military plus 1,548 dependents).

Based upon the geographic distribution of where people currently reside who are serving or employed at NAS Whidbey Island, the change in population would primarily affect Island County, and the towns of Oak Harbor and Coupeville within Island County. Table 3-16 shows the anticipated population that would be affected based upon the loss of 2,654 individuals.

Table 3-16 Regional Population Loss

County/Municipality	Existing Population (2000)	Estimated Population Change	% Change In Population
Island County	71,558	(2,263)	(3)
Oak Harbor	19,905	(2,166)	(11)
Coupeville	1,723	(98)	(6)
Skagit County	102,979	(353)	(<1)
Other	NA	(38)	(<1)
Total		**(2,654)**	

The regional population loss would be a minor impact on Island County and the local municipalities because the projected population loss would have only minor, indirect impacts on housing and local schools.

Of the 1,106 military personnel that would be reduced, an estimated 37% reside in military housing. Applied proportionally to the projected population loss, this equals approximately 409 military personnel and dependents in on-station military housing, and 697 persons living in rented or owned housing in the local community. Some temporary vacancies may occur in the private housing market as military families and bachelors relocate outside of the area. However, considering the anticipated level of population growth in the area, and the 6-year period over which occupied housing would be vacated, it is assumed that new owners and renters would be able to fill the vacancies left by relocating military personnel.

A portion of the military dependents are school-aged children who attend public schools in the area. Assuming for purposes of analysis that one-third of the dependents are school-aged children, and that all these military personnel leave the area, then approximately 439 students would create vacancies in the local school districts of Island County. The city of Oak Harbor has six elementary schools, two middle schools, and one high school. The town of Coupeville has one elementary school, one middle school, and one high school. (Additional schools are located in South Whidbey Island). Therefore, assuming that all of the school-aged dependents are attending all of these schools, none of the schools would experience significant impacts. In addition, with the growth rate in Island County expected over the six-year transition period as the EA-6B squadrons are replaced with EA-18G squadrons, new residents would fill vacancies within the school districts created by military dependents leaving the area.

As discussed in Section 3.1.1, Noise, replacement of the EA-6B with the EA-18G will slightly increase the noise exposure within two geographic areas in Island County. The area where the CY 2013 75-dB DNL noise contour exceeds the CY 2003 75-dB noise contour at Ault Field occurs within census tract 9701, near the intersection of Monkey Hill Road and Ducken Road, east of Washington State Route 20. Census tract 9701 extends from north of Ault Field, and eastward and southward into Oak Harbor. The area near OLF Coupeville where the CY 2013 65-db DNL noise contour exceeds the CY 2003 65-dB DNL noise contour is in census tract 9711. Census tract 9711 extends across Whidbey Island, southeastward from Coupeville and Ebey's Landing to slightly beyond the community of Keystone.

To determine the likelihood of a disproportionate effect on minority or low-income populations, demographic and economic data from these census tracts were compared with demographic and economic data for Island County as a whole (Table 3-17). A field survey also was conducted to improve the precision of this analysis (Melaas 2004a).

Table 3-17 Demographic and Economic Data for Census Tracts 9701 and 9711 in Comparison with Island County

	Island County	Census Tract 9701	Census Tract 9711
Race			
Total Persons	71,558	3,783	2,704
% White	87.1%	89.0%	92.8%
% Non-White	12.9%	11.0%	7.2%
Ethnicity			

Table 3-17 Demographic and Economic Data for Census Tracts 9701 and 9711 in Comparison with Island County

	Island County	Census Tract 9701	Census Tract 9711
Total Persons	71,558	3,783	2,704
Hispanic or Latino	4.1%	5.3%	4.7%
Non-Hispanic or Latino	95.9%	94.7%	95.3%
Low-Income			
Total Households	32,378	1,612	1,416
Percent below poverty in 1999	7.0%	7.1%	2.7%

Source: U.S. Bureau of the Census 2000.

Census tracts 9701 and 9711 have a slightly lower percentage of minority population than Island County as a whole, but a slightly higher percentage of Hispanic population than Island County as a whole. Census tract 9701 has a slightly higher percentage of low-income population than Island County as a whole.

Land use is described as rural in the area where the CY 2013 75-dB DNL noise contour extends beyond the CY 2003 75-dB DNL noise contour north of Ault Field in census tract 9701. Field observations of this affected area found forested lands, approximately three single-unit residences in an upscale residential development in the early stages of development, a commercial retail establishment with a small arms shooting range, and cattle and horse pastures. The field survey found no indication of low-income population "pockets" in this area (Melaas 2004a). Therefore, although census tract 9701 has a slightly higher percentage of Hispanic population than the community as a whole, general land use indicators and field survey verification indicate there will be no disproportionate effects on minority or low-income populations in the Ault Field area as a result of the Proposed Action.

Land use is described as commercial agriculture in the area where the CY 2013 65-dB DNL noise contour extends beyond the CY 2003 65-dB DNL noise contour west of OLF Coupeville in census tract 9711. Field observations of this affected area found open agricultural and grasslands, some forested land, approximately five single-unit residences, a commercial retail establishment, and agricultural structures associated with the Sherman Farms dairy. There are no farm worker residences within the Sherman Farms complex. The field survey found no indication of low-income population "pockets" in this area (Melaas 2004a). Therefore, although census tract 9711 has a slightly higher percentage of Hispanic population than the community as a whole, general land use indicators and field survey verification indicate there will be no

disproportionate effects on minority or low-income populations in the OLF Coupeville area as a result of the Proposed Action.

3.3.1.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

Because the projected personnel transitions would be the same under Alternative 1 and Alternative 2, the environmental consequences discussed under Alternative 1 also would occur under Alternative 2.

In addition to the minor facilities modifications, Alternative 2 includes construction of a 20,000-square-foot hangar addition to Hangar 10. Construction of a hangar addition would have no impact on on-station or regional population and housing. Temporary construction workers would increase the on-station population for the duration of the construction period. However, an increase of 20 to 30 workers over the 10-month construction period is not significant and would not affect the permanent on-station or regional population or create a demand for housing in the local area. Many of the workers are assumed to currently reside in the local area.

3.3.1.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.3.1.1, Affected Environment.

3.3.2 Economy and Employment

3.3.2.1 Affected Environment

Island County is within the Seattle-Bellevue-Everett Primary Metropolitan Statistical Area (PMSA). Approximately 25% of Island County residents commute beyond the county limits for employment, primarily to Snohomish, King, and Skagit counties (Office of Financial Management 2004). However, due to traffic concerns with availability of limited off-island linkages, Island County is working to develop more commercial centers and light industry that

will provide employment opportunities for county residents (Board of Island County Commissioners et al. 1998).

In 2002, total employment for Island County was 35,843 workers, and the county's unemployment rate was 6.3%. Total employment within the Seattle-Bellevue-Everett PMSA in 2002 was over 1.2 million, and the unemployment rate within the PMSA was 6.0% (U.S. Department of Commerce 2004; U.S. Department of Labor 2004).

Major employment sectors in Island County are government (37%) and health care and other services (37%) (Table 3-18). Due to its scenic and rural character, Island County is home to many retirees and seasonal residents, who are supported by most of its retail and service sector jobs. Moreover, even though much of the land area is considered rural, the specialty farming that does occur on Island County supports only 1% of its workforce. Within the government sector, the military represents approximately 24% of employment in Island County.

Table 3-18 Employment by Industry Sector in Island County, 2002

Industry	No. of Jobs	% of Total
Total Employment	35,843	-
Farm Employment	451	1
Non-Farm Employment	35,392	-
Private Employment	22,233	62
Retail Trade	3,661	10
Construction	2,511	7
Health Care and Social Assistance	2,122	6
Other Service-related Industries	11,158	31
Other Industries	2,391	7
Government and Government Enterprises	13,159	37
Federal (civilian)	1,418	4
Military	8,643	24
State and Local	3,098	-
State Government	377	1
Local Government	2,721	8

Note: Numbers may not add exactly due to rounding and nondisclosure of confidential information.

Sources: U.S. Department of Commerce 2004.

Employment centers in Island County are Oak Harbor and Coupeville. Businesses are small, with approximately 85% of them employing less than 10 workers (U.S. Bureau of Census 2004). NAS Whidbey Island is the county's major employer.

The total military payroll for Island County in 2002 was $525.8 million (U.S. Department of Commerce 2004), most of which is related to employment at NAS Whidbey Island. Payroll earnings in the military sector represent approximately 24.1% of the total personal income earned by the residents of Island County. This also does not account for the number of military retirees that remain in the area in order to take advantage of base amenities (i.e., medical, retail, travel). The retiree pensions spent locally also benefit the county's economy.

Island County has been working over recent years to diversify its economy, attract new businesses, and develop plans for becoming less reliant on NAS Whidbey Island as an economic stimulant. The need to diversify stems from concerns that there may be future decreases in the Department of Defense budget that could adversely affect the county's economy (Board of Island County Commissioners et al. 1998).

3.3.2.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

Use of existing facilities with minor internal modifications or renovations to existing facilities (i.e., simulators, engine test cell, NATTU, and AIMD) would result in minor impacts on the local economy. Minor internal modifications or renovations, including room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc., are sufficiently minor in scope such that they would not result in new construction or service jobs. However, a portion of the construction costs to implement these modifications would be spent in the local economy.

As a result of personnel reductions associated with replacement of the EA-6B with the EA-18G (1,106 military personnel over a 6-year period), the local economy would experience some losses in jobs and wages. It is assumed that the majority of these individuals currently reside locally; thus, Island County would experience most of the negative economic impact resulting from the reduction in disposable income and subsequent spending.

According to the Bureau of Economic Analysis, the average annual earnings in the military sector for Island County was $60,835 in 2002 ($525.8 million divided by 8,643 employees [see Table 3-18]). The loss of 1,106 personnel at NAS Whidbey Island would represent a 3% reduction in total average annual personal earnings in Island County ($2.2 billion), and a 12.8% reduction in the military sector average annual earnings ($525.8 million) for Island County.

Although the loss in personnel and earnings would impact the local economy, this impact would not be significant considering that Island County is part of the greater Seattle-Bellevue-Everett PSMA, and that economic growth is planned for services and retail to support the growing retirement and seasonal (e.g., vacation) residential communities. Although some of the smaller businesses that supply goods and services to military personnel may temporarily be affected over the 6-year transition period, many of the same goods and services are also available for purchase by military personnel at Ault Field, where these goods and services are provided for no or minimal costs. Therefore, the impact of the loss of earnings would not significantly affect the local economy.

3.3.2.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

The local economy would be affected by the personnel transition whether the Proposed Action is implemented under Alternative 1 or Alternative 2. The discussion of these impacts is included under Alternative 1.

However, implementation of the Proposed Action under Alternative 2 would offset some of the local economic impact of the reduction in personnel associated with replacement of the EA-6B with the EA-18G.

An estimated cost for construction of a 20,000-square-foot hangar addition is $6.7 million (Table 3-19).

Table 3-19 Derivation of Estimated Construction Cost of Hangar Addition

Cost Factors/square foot (SF)	
DoD aircraft maintenance hangar construction cost/SF	$191.47
Locale adjustment (NAS Whidbey Island)	1.27
Subtotal	**$243.17**
Size adjustment (20,000 SF vs. 27,419 SF)	1.04
Subtotal	**$252.90**
2007 construction year adjustment	1.33
Final Construction Cost/SF	**$336.36**
Module Addition (SF)	20,000
Total Construction Cost	**$6,727,200**

Sources: RSMeans 2004 a, b; U.S. Department of Defense 2003.

With the assumed construction period of 10 months, it is estimated that 20 to 30 part-time construction workers would be employed to complete the 20,000-square-foot hangar addition (RS Means 2004 a, b; U.S. Department of Defense 2003). The range in the number of employees is given to account for the specializations needed to complete the work necessary for an aircraft hangar addition, as there would be stages where only a portion of the workers would be on the job at one time.

To the extent feasible, local contractors, equipment, materials, and supplies would be utilized for this construction in order to allow the local economy to experience the economic benefit of Navy expenditures. Of the 2002 number of construction workers in Island County (Table 3-18), the number required for construction of the hangar addition represents approximately 1% of the total 2,511 present in the county. Based upon a history of military base activity in Island County and the surrounding counties, it is assumed that the local construction workers are experienced and able to accommodate the hangar construction needs; however, specially skilled workers are occasionally required during military construction that may not be available locally.

3.3.2.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.3.2.1, Affected Environment.

3.3.3 Land Use

3.3.3.1 Affected Environment

On-Station

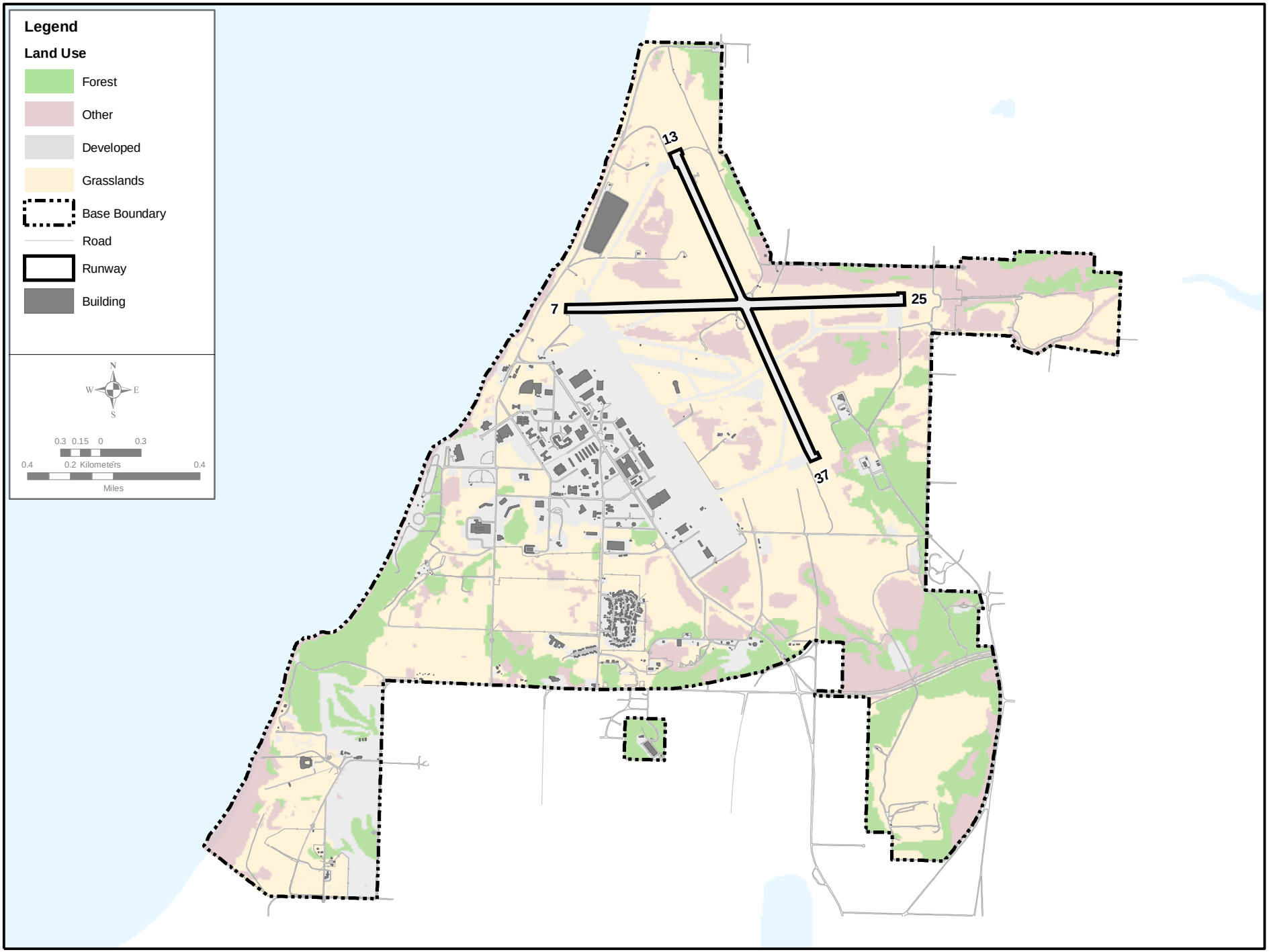
NAS Whidbey Island encompasses five land units, four of which are located in Island County (Ault Field, OLF Coupeville, Seaplane Base, and Lake Hancock), and one that is located in northern Oregon (NWSTF Boardman).

Ault Field is the main operational facility and the location of the primary airfield. Of the 4,337 acres that comprise Ault Field, approximately 24% is developed (Rothboeck 2004). The

remaining land area is undeveloped open space, forest, or supports agricultural outleases (see Figure 3-8).

The airfield occupies the northeast portion of Ault Field and has two 8,000-foot intersecting runways, Runways 7/25 and 13/31 (Figure 3-8). Other airfield facilities are located south and west of the runways and include the aircraft parking ramps, taxiways, aircraft maintenance hangars, fire station, passenger terminal, air traffic control tower, P-3 communications tactical support center, and various support facilities. Other land use functions at Ault Field include housing and administration, operational support, personnel support, and recreational facilities.

OLF Coupeville consists of a 5,400-foot runway, which is used primarily for FCLP operations. Other military training operations conducted at OLF Coupeville include helicopter, parachuting, and ground training. Limited operational facilities are located at OLF Coupeville and include an observation tower, a crash/fire vehicle building, and an electronic warfare signal emitter building. Most of the OLF's 664 acres consist of undeveloped open space and agricultural outleases.



Source: EA EST 1996.

Figure 3-8 On-Station Land Use
NAS Whidbey Island (Ault Field)

Seaplane Base occupies 2,784 acres along 10 miles of Crescent Harbor shoreline. Approximately 23% of the land area is developed and is used for jet fuel off-loading, ordnance storage, and training of the Explosive Ordnance Disposal (EOD) units and other Navy and military commands. Various housing and community support facilities also are located at Seaplane Base. However, much of Seaplane Base is undeveloped as it is constrained by Explosive Safety Quantity Distance (ESQD) arcs.

Lake Hancock is a 373-acre closed military range formerly used for practice bombing and rockets. As a result, Lake Hancock is largely undeveloped. Located south of OLF Coupeville, Lake Hancock is currently managed for wildlife and wetland conservation (Rothboeck 2004).

The 47,432-acre NWSTF Boardman is a military training range, largely undeveloped, that is used by the Navy and other branches of the armed forces for bombing, aerial gunnery, and ground training. The EA-6B squadrons do not conduct air-to-ground (e.g., bombing) training at NWSTF Boardman, but the SUA and MTRs associated with NWSTF Boardman are used for combat tactics training by the EA-6B squadrons and by aircrews from the other Services.

Regional Land Use

Existing land uses in the area surrounding Ault Field primarily include forested and agricultural/open fields (Figure 3-5). Rural single-family residential uses are scattered throughout the area, with residential concentrations present along the coastline. State parklands include Deception Pass State Park to the north of Ault Field and Joseph Whidbey State Park to the southwest (Figure 3-3).

The City of Oak Harbor is south of Ault Field and contains a mixture of residential, light-industrial, and commercial and service uses. State Route 20 extends the length of Whidbey Island, through the City of Oak Harbor and along the eastern boundary of Ault Field. Various commercial and light-industrial land uses are situated along State Route 20, becoming less concentrated beyond the city limits near Ault Field.

Various public, private, and Navy-owned marinas, boat launches, campgrounds, beaches, hiking trails, and golf courses are located along the shoreline of the City of Oak Harbor and Seaplane Base.

Existing land uses in the area surrounding OLF Coupeville primarily include forested and agricultural/open fields. Rural single-family housing occurs along the coastline to the west of

OLF Coupeville, and more concentrated residential uses occur to the east, along the coastline to the south of the airfield, and within the town of Coupeville. Commercial development in the town of Coupeville is primarily concentrated along the waterfront and on Main Street.

The northern portion of OLF Coupeville is located within the 25-square-mile Ebey's Landing National Historic Reserve, which also encompasses the town of Coupeville, Fort Ebey State Park, Rhododendron State Park, and Fort Casey State Park.

The Navy has acquired avigation easements (also known in some cases as joint stipulations) in the vicinity of OLF Coupeville. These easements provide landowners' consent for the EA-6B or follow-on aircraft of lesser or comparable noise level to fly at altitudes of 800 feet AGL, based on a maximum of 10,000 flights per calendar year. Development of land uses or creation of flight hazards or obstacles within the area that would interfere with the entry and egress of aircraft are prohibited.

Local Land Use Plans and Policies

Development at and around NAS Whidbey Island is controlled, guided, or influenced by the following plans and policies.

Airfield Recapitalization Plan. In 2002, the Navy finalized the NAS Whidbey Island Airfield Recapitalization Plan. The purpose of the plan is to define long-term (25 to 50 years) needs for structural improvements and replacements within the airfield complex; to develop an implementation strategy to meet those needs; and to identify areas for future flight line expansion.

The Airfield Recapitalization Plan is a component of the Navy Region Northwest's Regional Overview Plan for the Puget Sound Regional Shore Infrastructure Plan. This plan addresses both a no-growth and a 15% growth scenario at NAS Whidbey Island associated with consolidation of regional facilities. In either case, this plan envisions that the VAQ aircraft squadrons will remain at NAS Whidbey Island.

NAS Whidbey Island Activity Overview Plan. NAS Whidbey Island is currently finalizing an Activity Overview Plan, which will be a comprehensive land use and facilities plan to support the long-range vision of NAS Whidbey Island. The Activity Overview Plan includes

an analysis of the air station's potential airframe and squadron loading scenarios, including replacement of the EA-6B with the EA-18G aircraft; existing conditions and future operational needs of the mission-critical, mission-support, and personnel-support departments; and existing land use constraints and potential areas for development. The Activity Overview Plan states that the air station has sufficient hangar space to accommodate the EA-18G aircraft squadrons.

The recommendations of the Activity Overview Plan are summarized in a Strategic Action Plan that identifies near-, medium-, and long-term construction, renovation and demolition projects; and policy and planning actions. Among these recommendations is the demolition of surplus infrastructure and relocation of inappropriately sited functions and facilities. In addition, the Strategic Action Plan recommends that the efficiency of existing hangar utilization be evaluated to increase operational efficiency and maximize hangar space available for future uses.

Base Exterior Architecture Plan. A Base Exterior Architecture Plan was developed in 1983 to evaluate the visual character of developed areas within NAS Whidbey Island and to provide design guidelines for a cohesive visual environment. The Base Exterior Architecture Plan delineates districts and sub-areas based on geographic areas of similar function and visual appearance. The sub-areas are further designated as Critical (having poor visual quality), Very Critical (representing priority problem areas), or Non-Critical (having a relative absence of functional problems). Future development or expansion plans should conform to the design guidelines, although some exemptions are made for maintenance hangars. The Base Exterior Architecture Plan guidelines also prescribe signage, massing, and color.

Integrated Cultural Resources Management Plan, NAS Whidbey Island, Washington. The Navy has prepared an Integrated Cultural Resources Management Plan that summarizes the archeological and historic surveys at Ault Field, Seaplane Base, OLF Coupeville, Lake Hancock, and NWSTF Boardman that have been completed and identifies management actions in compliance with Section 106 and Section 110 of the National Historic Preservation Act.

NAS Whidbey Island Integrated Natural Resources Management Plan. NAS Whidbey Island prepared an INRMP in 1996, in compliance with DoD Instruction 4715.3 and the Sikes Act (16 U.S.C. 670a, *et seq.*) (EA EST 1996). The INRMP is a management tool to restore,

protect, preserve, and properly use natural resources within the air station that are compatible with and in support of the military mission. The INRMP identifies land, water, plant, fish, and wildlife resources on Ault Field, Seaplane Base, Lake Hancock, and OLF Coupeville, and provides recommendations on how to manage natural resources at each location.

NAS Whidbey Island AICUZ Study. With urban development increasing around the boundaries of its military air stations, the DoD established its Air Installations Compatible Use Zones (AICUZ) Program in the mid-1970s. The goals of the program are to preserve the military flying mission and protect the health, safety, and welfare of those living and working near the air stations by promoting compatible development around the boundaries of the air stations.

Each Naval Air Station has conducted an AICUZ study to assess its aircraft operations and associated accident potential zones (APZs) and noise zones. The APZs and noise zones are considered the minimum acceptable area where land use controls are needed to promote compatible development around the boundaries of the air station. Local governments are encouraged to adopt guidelines promoting compatible development in the APZs and noise zones. An update to an AICUZ study is generally conducted when an air station has a significant change in aircraft operations (i.e., the number of takeoffs and landings), flight paths or procedures used, and/or type of aircraft stationed at the facility.

In an AICUZ study, the Navy typically presents noise zones in terms of annual average DNL sound levels. (See Section 3.1.1 for a description of the DNL noise metric.) Average annual DNL values around an air station are presented as contours that connect points of equal value. The area between noise contours is known as a "Noise Zone." Noise Zones typically identified in an AICUZ study are:

- Noise Zone 1: Less than 65-dB DNL,
- Noise Zone 2: 65- to 70-dB DNL,
- Noise Zone 3: 70- to 75-dB DNL, and
- Noise Zone 4: Greater than 75-dB DNL.

Using this scale, the DoD's AICUZ guidelines recommend land uses that are compatible within each of these noise zones. Residential land use, for example, is considered compatible where the DNL is less than 65 dB. Residential land use is compatible in the 65- to 70-dB DNL noise zone and the 70- to 75-dB DNL noise zone if sound attenuation measures have been incorporated into the building design and construction to reduce interior noise levels. Although compatible with restrictions, the Navy strongly recommends that community planners preclude permitting residential land uses to locate within the 65- to 70-dB and 70- to 75-dB DNL noise zones. Residential land use is incompatible within the greater than 75-dB DNL noise zone.

APZs also are identified in most AICUZ studies. The number and type of airfield operations are used as the basis for identifying APZs around an air station. APZs are areas where an aircraft mishap is most likely to occur if one occurs, and based on historical data, follow departure, arrival, and pattern flight tracks on and near the airfield runways. The Navy recommends to local planning agencies that certain developments be excluded from these areas to protect the community if a mishap were to occur.

The first AICUZ study for NAS Whidbey Island was completed in 1977 and updated in 1986. The Navy is currently preparing a new AICUZ update, which will reflect current and future conditions at NAS Whidbey Island, including replacement of the EA-6B with the EA-18G.

Island County Comprehensive Plan. The Island County Comprehensive Plan was adopted in 1998 in accordance with the Washington State Growth Management Act. The plan was established to manage growth in the county through the year 2020. As mandated under RCW 36.70A.070, the elements addressed include Land Use, Rural, Housing, Capital Facilities, Utilities, Transportation, and Shoreline Management. Several optional elements are addressed in the plan as well, including Parks, Recreation and Open Space, Natural Lands, Historic Preservation, and Water Resources (Board of Island County Commissioners et al. 1998).

The Comprehensive Plan acknowledges the county's association with NAS Whidbey Island, as well as the impacts associated with aircraft operations at Ault Field and OLF Coupeville. The plan designates an "Airport and Aviation Safety Overlay," which recommends that future land use adjacent to Ault Field and OLF Coupeville be maintained as rural and rural agricultural.

These areas are designated rural and rural agricultural to encourage low-density development within the air station's noise zones.

Island County adopted the noise contours from the 1993 noise study as published in the *Draft Environmental Impact Statement (EIS) for the Management of Air Operations at NAS Whidbey Island* (U.S. Department of the Navy 1993) to implement the Airport and Aviation Safety Overlay district through the county's zoning ordinance and other elements of the Island County Code. Existing land uses and zoning are consistent with the Navy's recommendations for land use compatible within the APZs, although specific regulations have not yet been adopted for that purpose. However, the goals and policies exist in the county's Comprehensive Plan to support the adoption of codes for compatible development within the APZs.

Consistent with the Comprehensive Plan for land uses impacted by aircraft operations, Island County has adopted a Zoning Ordinance; an Airport and Aircraft Operations Noise Disclosure Ordinance for property sold, rented, or leased within the noise zones around Ault Field and OLF Coupeville; and a Noise Level Reduction Ordinance to specify minimum standards for building construction within the noise zones around Ault Field and OLF Coupeville. In addition, to help ensure the safety of aircraft operations, the county has adopted a Signs and Lighting Ordinance that is designed to help preserve the dark skies and rural character of the county.

City of Oak Harbor Comprehensive Plan. The City of Oak Harbor Comprehensive Plan was adopted in 2003 in accordance with the Washington State Growth Management Act. The plan was established to manage growth in the city through the year 2013. As mandated under RCW 36.70A.070, the elements addressed include Land Use, Housing, Capital Facilities, Utilities, Transportation, and Shoreline Management, as well as several optional elements.

The Comprehensive Plan contains goals and policies that address the Navy's AICUZ land use compatibility recommendations, and an element on "City of Oak Harbor and Naval Air Station Whidbey Island Community Cooperation," which supports growth and development compatible with operations at Ault Field. The AICUZ recommendations are implemented through the city's adopted Aviation Environs Overlay Zone, noise attenuation standards, and noise disclosure requirement in the municipal code. Land uses within the Aviation Environs Overlay Zone are designated for low-density development.

The City of Oak Harbor adopted the noise contours from the 1993 noise study as published in the *Draft EIS for the Management of Air Operations at NAS Whidbey Island* (U.S. Department of the Navy 1993) to implement the Aviation Environs Overlay Zone through the city's Zoning Ordinance and other elements of the municipal code. Existing land use and zoning are consistent with the Navy's recommendations for land use compatible within the APZs, although specific regulations have not yet been adopted for that purpose. However, the goals and policies exist in the Comprehensive Plan to support the adoption of codes for compatible development within the APZs.

Town of Coupeville Comprehensive Plan. The Town of Coupeville Comprehensive Plan was adopted in 2003 in accordance with the Washington State Growth Management Act. The plan was established to manage growth in the town through the year 2013. As mandated under RCW 36.70A.070, the elements addressed include Land Use, Housing, Capital Facilities, Utilities, Transportation, and Shoreline Management, as well as several optional elements. The town has not adopted any policies or goals designed specifically to ensure development compatible with AICUZ recommendations. However, the goals and policies of the Comprehensive Plan and current zoning for the town foster minimal development on the east, where aircraft noise from OLF Coupeville has a greater impact (Melaas 2004b). The plan also recommends infill development in the central core of the town, where aircraft noise has less of an impact.

Coastal Zone Management Act. The federal Coastal Zone Management Act (CZMA) of 1972 encourages states to develop management plans for coastal zones to protect natural resources and shoreline-related commercial land uses of the nation's shorelines. Section 307 of the CZMA stipulates that where a federal project initiates reasonably foreseeable effects on any coastal use or resource (land or water use, or natural resources), the action must be consistent to the maximum extent practicable with the enforceable policies of the affected state's federally approved coastal management plan.

The Washington Coastal Zone Management Program (CZMP) provides for management of the coastal zone within the 15 counties containing the state's coastal resources. It is implemented by the Washington Department of Ecology through the Shorelands and

Environmental Assistance Program. Under the CZMP, activities that affect any land use, water use, or natural resource of the coastal zone must comply with six laws, or "enforceable policies." These include: the Shoreline Management Act (SMA), the State Environmental Policy Act (SEPA), the Clean Air Act (CAA), the Clean Water Act (CWA), the Energy Facility Site Evaluation Council (EFSEC), and the Ocean Resource Management Act (ORMA).

Federal lands such as NAS Whidbey Island, which are "lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agency," are statutorily excluded from the CZMA's definition of Washington's "coastal zone" (USC Section 1453[1]). If, however, the proposed federal activity affects coastal resources or uses beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies.

Existing Land Use within CY 2003 Noise Zones

Portions of Island County are within the CY 2003 noise zones for Ault Field and OLF Coupeville. Figure 3-5 indicates existing land use within these noise contours, and Tables 3-20 and 3-21 provide the total area, by land-use category, within the 65- to 70-dB DNL, 70- to 75-dB DNL, and greater than 75-dB DNL noise zones around Ault Field and OLF Coupeville, respectively.

As shown on Figure 3-5 and Table 3-20, approximately 93% of the land uses within the noise contours around Ault Field are considered compatible land uses, including water/wetlands, federal (e.g., military), forested, and agricultural. Less than 1% of the total area within the greater than 65-dB DNL noise zone consists of residential uses, which are generally considered to be incompatible with aircraft operations.

Table 3-20 Existing Land Uses within CY 2003 Noise Zones around Ault Field

Land Use	Noise Zone (acres)			Total Acres (% of Total Land Use)
	65- to 70-dB DNL	70- to 75-dB DNL	>75-dB DNL	
Agricultural	2,223	2,472	5,984	10,679 (20)
Rural Mixed Use/Commercial	19	47	2	68 (<1)
Forested	1,182	169	203	1,554 (3)
Industrial	0	0	0	0 (0)
Municipality/Park	2,007	830	181	3,018 (6)

Federal	612	657	3,934	5,203 (10)
Residential	296	75	43	414 (<1)
Water/Wetland	19,228	7,651	6,428	33,307 (61)
Total	**25,567**	**11,901**	**16,775**	**54,243 (100)**

As shown on Figure 3-5 and Table 3-21, approximately 94% of the land uses within the noise contours around OLF Coupeville are considered compatible land uses, including water/wetlands, federal (e.g., military), forested, and agricultural. Approximately 4% of the total area consists of residential uses, which are generally considered to be incompatible with aircraft operations.

Table 3-21 Existing Land Uses within CY 2003 Noise Zones around OLF Coupeville

Land Use	Noise Zone (acres)			Total Acres (% of Total Land Use)
	65- to 70-dB DNL	70- to 75-dB DNL	>75-dB DNL	
Agricultural	3,738	2,021	954	6,713 (40)
Rural Mixed Use/Commercial	0	0	0	0 (0)
Forested	606	398	180	1,184 (7)
Industrial	0	1	27	28 (<1)
Municipality/Park	138	97	5	240 (1)
Federal	0	13	647	660 (4)
Residential	319	144	130	593 (4)
Water/Wetland	6,118	1,047	10	7,175 (43)
Total	**10,919**	**3,721**	**1,953**	**16,593 (100)**

3.3.3.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

On-Station

Use of existing facilities with minor internal modifications or renovations to existing facilities (i.e., simulators, engine test cell, NATTU, and AIMD) would not result in any changes to land uses at Ault Field or OLF Coupeville. Minor internal modifications or renovations would include room configuration, electrical power routing, HVAC, mountings for replacement equipment, etc. These modifications and renovations would not change the type or use of these facilities. Therefore, existing on-station land uses would remain the same following replacement of the EA-6B with the EA-18G, and no significant impacts would occur.

Regional

Aircraft operations associated with replacement of the EA-6B with the EA-18G aircraft would result in less land area within the greater than 65-dB DNL noise zones of Ault Field and OLF Coupeville (Figure 3-5). Tables 3-22 and 3-23 provide the total area, by land use category, within the projected 65- to 70-dB, 70- to 75-dB, and greater than 75-dB DNL noise zones for CY 2013 around Ault Field and OLF Coupeville, respectively. Tables 3-24 and 3-25 show the net change in land uses around Ault Field and OLF Coupeville, respectively, between the CY 2003 and CY 2013 greater than 65-dB DNL noise zones.

Table 3-22 Existing Land Uses within CY 2013 Noise Zones around Ault Field

Land Use	Noise Zone (acres)			Total Acres (% of Total Land Use)
	65- to 70-dB DNL	70- to 75-dB DNL	>75-dB DNL	
Agricultural	1,420	3,135	4,964	9,519 (30)
Rural Mixed Use/ Commercial	3	47	1	51 (<1)
Forested	466	130	175	771 (2)
Industrial	0	0	0	0
Municipality/Park	669	657	8	1,334 (4)
Federal	439	254	2,259	2,952 (9)
Residential	104	80	5	189 (<1)
Water/Wetland	7,656	5,124	3,730	16,510 (53)
Total	**10,757**	**9,427**	**11,142**	**31,326 (100)**

Table 3-23 Existing Land Uses within CY 2013 Noise Zones around OLF Coupeville

Land Use	Noise Zone (acres)			Total Acres (% of Total Land Use)
	65- to 70-dB DNL	70- to 75-dB DNL	>75-dB DNL	
Agricultural	4,003	2,003	371	6,377 (43)
Rural Mixed Use/ Commercial	0	0	0	0 (0)
Forested	426	336	78	840 (6)
Industrial	0	12	17	29 (<1)
Municipality/Park	138	25	0	163 (1)
Federal	3	75	593	671 (5)
Residential	330	146	71	547 (4)
Water/Wetland	6,269	0	0	6,269 (42)
Total	**11,169**	**2,597**	**1,130**	**14,896 (100)**

Table 3-24 Net Change in Area within Projected Greater than 65-dB DNL Noise Zones around Ault Field (CY 2003 and CY 2013)

Land Use	Total Area CY 2003 (acres)	Total Area CY 2013 (acres)	Net Change[1]	% Net Change[1]
Agricultural	10,679	9,519	(1,160)	(11)
Rural Mixed Use/ Commercial	68	51	(17)	(25)
Forested	1,554	771	(783)	(50)
Industrial	0	0	0	0
Municipality/Park	3,018	1,334	(1,684)	(56)
Federal	5,203	2,952	(2,251)	(43)
Residential	414	189	(225)	(54)
Water/Wetland	33,307	16,510	(16,797)	(50)
Total	**54,243**	**31,326**	**(22,917)**	**(42)**

[1] Number in parentheses denote a decrease.

Table 3-25 Net Change in Area within Projected Greater than 65-dB DNL Noise Zones around OLF Coupeville (CY 2003 and CY 2013)

Land Use	Total Area CY 2003 (acres)	Total Area CY 2013 (acres)	Net Change[1] (acres)	% Net Change[1]
Agricultural	6,713	6,377	(336)	(5)
Rural Mixed Use/ Commercial	0	0	0	0
Forested	1,184	840	(344)	(29)
Industrial	28	29	1	<0
Municipality/Park	240	163	(77)	(32)
Federal	660	671	10	(2)
Residential	593	547	(46)	(8)
Water/Wetland	7,175	6,269	(906)	(13)
Total	**16,593**	**14,896**	**(1,697)**	**(10)**

[1] Number in parentheses denote a decrease.

In the vicinity of Ault Field, the effect of replacing the EA-6B with the EA-18G would be a 42% overall decrease in the acreage of land and water located within the projected greater than 65-dB DNL noise zones in 2013. Specific decreases would occur in forested (50%); residential (54%); municipality/park (56%); and rural mixed use/commercial (25%) land uses.

Around OLF Coupeville, the effect of replacing the EA-6B with the EA-18G would be an overall decrease of 10% in the amount of land and water areas that would be located within the projected greater than 65-dB noise zones in 2013, including a 29% decrease in forested land; an

8% decrease in residential land; a 32% decrease in municipality/park uses; and a 5% decrease in agricultural land.

Local Land Use Plans and Policies

Airfield Recapitalization Plan. The minor facilities modifications proposed under Alternative 1 would be consistent with the Airfield Recapitalization Plan. None of the facility modifications would result in a change to the land use or preclude any of the structural improvements and replacements proposed within the plan for the airfield complex. This Airfield Recapitalization Plan also envisions that the VAQ squadrons would remain at NAS Whidbey Island.

NAS Whidbey Island Activity Overview Plan. The minor facilities modifications proposed under Alternative 1 would be consistent with the NAS Whidbey Island Activity Overview Plan. None of the facility modifications would affect or be affected by the recommendations in the Activity Overview Plan for demolition of surplus infrastructure and relocation of inappropriately sited functions and facilities. These recommendations account for the air station's potential airframe- and squadron-loading scenarios associated with replacement of the EA-6B by the EA-18G.

Base Exterior Architecture Plan. The minor facilities modifications proposed under Alternative 1 would be consistent with the Base Exterior Architecture Plan. None of the proposed facility modifications would affect the visual character of developed areas within NAS Whidbey Island.

NAS Whidbey Island Integrated Natural Resource Management Plan. The minor facilities modifications proposed under Alternative 1 would be consistent with the Integrated Natural Resource Management Plan. The locations of facility modifications are in areas of the station that are currently developed and would not result in land disturbance or loss of natural areas at the station. Replacement of the EA-6B with the EA-18G would have no effect on natural resources at NAS Whidbey Island, as discussed in Sections 3.2.1 and 3.2.2.

Integrated Cultural Resources Management Plan, NAS Whidbey Island. The minor facilities modifications proposed under Alternative 1 would be consistent with the Integrated Cultural Resource Management Plan. None of the facility modifications would affect cultural resources at NAS Whidbey Island. Replacement of the EA-6B with the EA-18G would have no effect on cultural resources at NAS Whidbey Island, as discussed in Section 3.3.4.

NAS Whidbey Island AICUZ Study. Implementation of the Proposed Action under Alternative 1 would be consistent with the NAS Whidbey Island AICUZ Study. The Navy's AICUZ Study Update will reflect the noise zones and APZs associated with aircraft operations following replacement of the EA-6B with the EA-18G. Under the AICUZ Program, the Navy makes recommendations to local governments on compatible land uses in areas affected by aircraft noise and areas where the potential for aircraft accidents is higher than normal (i.e., APZs). The APZs and noise zones are considered the minimum acceptable area where land use controls are needed to promote compatible development around the boundaries of the air station. Local governments are encouraged to adopt guidelines promoting compatible development in the APZs and noise zones.

As discussed in Section 3.1.1, the projected noise zones following replacement of the EA-6B with the EA-18G will result in less land area exposed to aircraft noise (e.g., greater than 65-dB DNL).

The number and type of airfield operations and the flight tracks are used as the basis for identifying APZs around an air station. While the projected number of airfield operations will be reduced, the flight tracks will remain the same with replacement of the EA-6B with the EA-18G. While the AICUZ APZs adopted in 1986 do not represent current flight tracks, operations tempo, or air operations management procedures, the notional CY 2003 APZs and APZs that reflect CY 2013 flight operations will be the same.

Island County Comprehensive Plan. Because the projected noise zones associated with replacement of the EA-6B with the EA-18G will result in less land area within the noise contours for Ault Field and OLF Coupeville, and the internal modifications will affect only on-station

facilities, implementation of the Proposed Action under Alternative 1 would be consistent with the Island County Comprehensive Plan.

City of Oak Harbor Comprehensive Plan. Because the projected noise zones associated with replacement of the EA-6B with the EA-18G will result in less land area within the noise contours for Ault Field, and the internal modifications will affect only on-station facilities, implementation of the Proposed Action under Alternative 1 would be consistent with the City of Oak Harbor Comprehensive Plan.

Town of Coupeville Comprehensive Plan. The Town of Coupeville's planning process under its Comprehensive Plan will not be affected by the differences in noise effects resulting from the replacement of the EA-6B with the EA-18G. The town has not adopted any policies or goals designed specifically to ensure development compatible with AICUZ recommendations. However, the goals and policies of the Comprehensive Plan and current zoning are consistent with continued use of airfield operations at OLF Coupeville. Because the projected noise zones associated with replacement of the EA-6B with the EA-18G will result in less land area within the noise contours for OLF Coupeville, and the internal modifications will affect only on-station facilities, implementation of the Proposed Action under Alternative 1 would be consistent with the Town of Coupeville Comprehensive Plan.

Coastal Zone Management Act. The Proposed Action will have an effect on Washington's coastal zone resources by affecting local air quality. However, the Proposed Action is consistent to the maximum extent practicable with the state's enforceable policies as contained in the implementing regulations of the Clean Air Act. Total annual mobile source emissions of CO, NO_x, and VOCs are projected to increase, and emissions of SO_2 and PM_{10} are projected to decrease. Stationary source emissions of CO from the test cell are projected to increase, and emissions of VOCs, NO_x, SO_2, and PM_{10} from the test cell are projected to decrease.

NAS Whidbey Island's Title V Operating Permit will need to be revised since the existing permit conditions are based on the emission factors and limit on test hours for the EA-6B, and the emission factors and number of test hours will differ for the EA-18G. The permit revision will be based on EA-18G emission factors and test hours to ensure that the projected annual

emissions will be managed consistent with existing air quality regulations. The projected increase in CO emissions is not considered significant because it is well below the PSD threshold established under the Clean Air Act. The projected increase in mobile source emissions will have minimal impact on ambient air quality in Island, Skagit, and Whatcom counties. Each of these counties is in attainment for criteria pollutants, and the projected increases in emissions of CO, NO_2, and VOCs (a contributor to ozone) are less than 1% of the total mobile source emissions in Island, Skagit, and Whatcom counties and will not affect the attainment status of the region. There have been no violations of the NAAQS, and as shown in Table 3-4, air quality levels historically have been below the standards.

Therefore, the projected increase in stationary source and mobile source emissions is considered minor and insignificant. No other effects on coastal resources are reasonably foreseeable. The Proposed Action will have no other effect on the coastal zone, such as marine water quality, shoreline land use, or submerged marine sediments. Therefore, Alternative 1 is consistent to the maximum extent practicable with the applicable enforceable policies of the Washington Coastal Zone Management Program.

3.3.3.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

On-Station

Construction of a hangar modification would have a minor affect on on-station land uses. Surface parking areas and several utility and storage structures would need to be relocated for construction of the hangar addition to Hangar 10. Utility and storage structures include two air-conditioner service units for Hangar 8, a ready-service locker that contains ammunition, a smoking shelter, a spill containment unit, a Conex storage box, and several utility "banks." These maintenance buildings and minor support facilities/utilities would need to be demolished and/or relocated to accommodate the estimated 20,000-square-foot hangar addition.

Regional

Regional land use impacts under Alternative 2 would be the same as those discussed for Alternative 1, because the noise exposure associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same land use impacts under both Alternative 1 and Alternative 2. The hangar modification would not result in any regional land use impacts since proposed construction would occur entirely on base.

Local Land Use Plans and Policies

Airfield Recapitalization Plan. The additional construction proposed under Alternative 2 would be consistent with the Airfield Recapitalization Plan. The hangar addition would occur adjacent to Hangar 10 and thus be consistent with the existing operational land use. Neither the facility modifications nor the hangar addition would preclude any of the structural improvements and replacements proposed within the plan for the airfield complex. This Airfield Recapitalization Plan also envisions that the VAQ squadrons would remain at NAS Whidbey Island.

NAS Whidbey Island Activity Overview Plan. The additional construction proposed under Alternative 2 would be consistent with the NAS Whidbey Island Activity Overview Plan. Construction of the hangar addition would not affect or be affected by the recommendations in the Activity Overview Plan for demolition of surplus infrastructure and relocation of inappropriately sited functions and facilities. These recommendations account for the air station's potential airframe- and squadron-loading scenarios that include replacement of the EA-6B with the EA-18G.

Base Exterior Architecture Plan. The additional construction proposed under Alternative 2 would be consistent with the Base Exterior Architecture Plan. The hangar addition would be consistent with the design guidelines set forth in the Base Exterior Architecture Plan and would not detract from the quality of the visual environment at NAS Whidbey Island. The guidelines recommend that hangar facades be designed to accommodate the insignias of the fighter

squadrons stationed at NAS Whidbey Island; that hangars and flight line structures conform to specific exterior color palettes; and that new construction reflect the massing of existing buildings. Exemptions to the design guidelines include the type of siding material used for maintenance hangars. The hangar addition would have metal siding and would otherwise conform to these design recommendations.

NAS Whidbey Island Integrated Natural Resource Management Plan. The additional construction proposed under Alternative 2 would be consistent with the Integrated Natural Resource Management Plan. The locations of facility modifications and the hangar addition are in areas of the station that are currently developed and would not result in land disturbance or loss of natural areas at the station. Replacement of the EA-6B with the EA-18G will have no effect on natural resources at NAS Whidbey Island, as discussed in Sections 3.2.1 and 3.2.2.

Integrated Cultural Resources Management Plan, NAS Whidbey Island. The additional construction proposed under Alternative 2 would be consistent with the Integrated Cultural Resource Management Plan. Construction of the hangar modification would have no effect on cultural resources at NAS Whidbey Island, as discussed in Section 3.3.4.3 Replacement of the EA-6B with the EA-18G aircraft will have no effect on cultural resources at NAS Whidbey Island, as discussed in Section 3.3.4.2

NAS Whidbey Island AICUZ Study. Implementation of the Proposed Action under Alternative 2 would be consistent with the NAS Whidbey Island AICUZ Study. The noise exposure associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same land use impacts under both Alternative 1 and Alternative 2.

Island County Comprehensive Plan. Implementation of the Proposed Action under Alternative 2 would be consistent with the Island County Comprehensive Plan. The noise exposure associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same land use impacts under both Alternative 1 and Alternative 2.

City of Oak Harbor Comprehensive Plan. Implementation of the Proposed Action under Alternative 2 would be consistent with the City of Oak Harbor Comprehensive Plan. The noise exposure associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same land use impacts under both Alternative 1 and Alternative 2.

Town of Coupeville Comprehensive Plan. Implementation of the Proposed Action under Alternative 2 would be consistent with the Town of Coupeville Comprehensive Plan. The noise exposure associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same land use impacts under both Alternative 1 and Alternative 2.

Coastal Zone Management Act. Implementation of the Proposed Action under Alternative 2 would be consistent to the maximum extent practicable with the state's enforceable policies as contained in the implementing regulations of the Clean Air Act. The air emissions associated with aircraft operations following replacement of the EA-6B with the EA-18G aircraft would result in the same air quality impacts under both Alternative 1 and Alternative 2. Under Alternative 2, no other coastal resources would be affected by implementation of the Proposed Action.

3.3.3.4 No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.3.3.1, Affected Environment.

3.3.4 Cultural Resources

3.3.4.1 Affected Environment

The 1966 National Historic Preservation Act (Public Law 89-665, as amended by Public Law 96-515; 16 USC 470 *et seq.*) provides for the establishment of the National Register of Historic Places (NRHP) to include historic properties such as districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, and culture. Section 106 of the Act requires that federal agencies with jurisdiction over a proposed federal project take into account the effect of undertakings on cultural resources listed, or eligible for listing, on the NRHP, and afford State Historic Preservation Officers (SHPOs) and the Advisory Council on Historic Preservation an opportunity to comment with regard to an undertaking. The NRHP eligibility criteria are defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60).

The Navy has conducted inventories of currently known cultural resources at NAS Whidbey Island that identify historical properties within Ault Field, Seaplane Base, OLF Coupeville, Lake Hancock, and NWSTF Boardman that are listed or potentially eligible for listing in the NRHP (Dames & Moore 1994; EDAW, Inc., 2002; LAAS, 1997). Seven NRHP-eligible archaeological sites (prehistoric shell midden deposits) are located at Seaplane Base and Lake Hancock. However, no known archaeological sites are located within Ault Field or OLF Coupeville.

Five archaeologically sensitive locations have been identified at Ault Field (Dames & Moore 1994): two are located are along the shore of Rosario Strait (one south of Rocky Point and one north of the sewage disposal pond), two are located along Hoffman Road (one south of Sullivan Road and one south of Frostad Road), and one is located west of the junction of State Route 20 and Fakkema Road. All of these archaeologically sensitive locations are between 1.5 to 2 miles from the locations of the proposed new construction or facility modification under Alternatives 1 and 2.

The following structures at Ault Field are considered to be potentially eligible for listing on the NRHP (EDAW, Inc. 2002):

- **Building 112 (Hangar 1).** Hangar 1 is the only remaining hangar of four structures of its type constructed at the beginning of World War II. This hangar was instrumental to aerial patrols and crew training during the war. Associated with it are two adjacent "Ready Lockers," Buildings 457 and 458. These structures have been

used for storage of munitions. Hangar 1 has undergone minor alterations but has retained its integrity. This structure and associated Buildings 457 and 458 are eligible for NRHP listing under Criterion A, based on their association with naval aviation during World War II, and under Criterion C as a distinctive example of a military structure quickly erected to fulfill war needs.

- **Building 118 (Theater).** This building, which has surviving Art Modern architectural details, served as the base theater. It played an important role in the social life of the base, such as maintaining the morale of the military personnel deployed away from home during wartime. Live shows and theatrical performances were staged here, and it also served as the movie theatre. This building is eligible for listing in the NRHP under Criterion A.

- **Buildings 180 and 220.** Built during World War II, these two structures housed Navy planetariums and were used for training naval fliers in celestial navigation. While this form of orienteering is very ancient, it was still used for training during World War II to compensate for the possible failure of navigation instruments. These buildings are eligible for listing in the NRHP under Criterion A, based on their historical connection to flight training at Ault Field during World War II. Their design is possibly unique in Washington State and is directly related to their celestial navigation function. Consequently, they also are eligible for listing in the NRHP under Criterion C.

The northern portion of OLF Coupeville is located within the Central Whidbey Historic Preservation District. Also known as Ebey's Landing National Historic Reserve, this district covers approximately 25 square miles, including the town of Coupeville, and extends approximately 6 miles north and south of Coupeville (National Park Service 2004a). Contained within the district are 103 buildings, 286 structures, and one object that are on the National Register of Historic Places. None of the buildings or structures that are part of this district are located within OLF Coupeville (Dames & Moore 1994).

Shown on Table 3-26 are components of Ebey's Landing National Historic Reserve that are located within the CY 2003 greater than 65-dB DNL noise zone for OLF Coupeville.

Table 3-26 NRHP-Listed Sites at Ebey's Landing National Historic Reserve Located within the Greater than 65-dB DNL Noise Zone (CY 2003 and CY 2013)

CY 2003	CY 2013
Town of Coupeville	
E.O. Lovejoy House	No listed sites
Newcomb House	

Table 3-26 NRHP-Listed Sites at Ebey's Landing National Historic Reserve Located within the Greater than 65-dB DNL Noise Zone (CY 2003 and CY 2013)

CY 2003	CY 2013
Newcomb Property	
Bergman House	
Benson House	
Hughes House	
Bradt House	
Island County (outside town of Coupeville)	
Reuble Farm	Reuble Farm
John Kineth Farmhouse	John Kineth Farmhouse
Sam Keith House	Sam Keith House
Wiley Place	Wiley Place
Strong Granary	Strong Granary
Old Anderson Place	Old Anderson Place
Grove Terry Place	Grove Terry Place
Fort Casey Housing/Myers House	Fort Casey Housing/Myers House
Fort Casey Pump House	Fort Casey Pump House
C. Wanamaker House	C. Wanamaker House
J. Gould House/Miller House	J. Gould House/Miller House
Strong House	Strong House
Gilbert Place/Eggerman House	Gilbert Place/Eggerman House
Gillespie House	Gillespie House
Sam Crockett House	Sam Crockett House
H. Crockett House/Boyer Farm	H. Crockett House/Boyer Farm
	Col. W. Crockett Farmhouse
	Thomas Sullivan House
	Engle Farm

Source: Kwarsick 2004; Island County Department of Planning and Community Development 2004.

Five NRHP-listed sites are located in Island County, in addition to those that are components of Ebey's Landing National Historic Reserve. These include Cama Beach Resort, Benjamin Loers House, the Olympic Club, Smith Island Light House, and the Utsalady Ladies Air Building. These five NRHP-listed sites are located more than 4 miles from either OLF Coupeville or Ault Field, and are not located within the CY 2003 DNL noise contours for either airfield.

3.3.4.2 Environmental Consequences under Alternative 1: Minor Facilities Modifications

The context for the historic resources at NAS Whidbey Island is an active airfield subject to aircraft noise impact. As shown on Figure 3-5, the projected (CY 2013) 65-dB DNL noise contour associated with aircraft operations at NAS Whidbey Island following replacement of the EA-6B with the EA-18G will be less than the existing (CY 2003) 65-dB DNL noise contour for aircraft operations at NAS Whidbey Island, except for a small area on the west side of OLF Coupeville. Overall, the projected DNL noise contours will result in approximately 33% less land area within the 65-dB or greater DNL noise contour around Ault Field and OLF Coupeville. As shown in Table 3-26, fewer NRHP-listed structures will be located within the greater than 65-dB DNL noise contours for OLF Coupeville. The potential impacts on cultural resources are discussed below.

Use of existing facilities and functions with minor internal modifications or renovations would not impact cultural resources at NAS Whidbey Island. The airfield facilities (e.g., NATTU, AIMD, engine test cell, simulator) that would be modified or renovated are not listed on the NRHP, nor are they considered potentially eligible for listing on the NRHP (Dames & Moore 1994). Four structures at NAS Whidbey Island have been determined to be NRHP eligible: Building 112 (Hangar 1), Building 118 (Skywarrior Theater), and Buildings 180 and 220 (Former Celestial Navigation Training). None of these structures would be altered as a result of the Proposed Action.

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of vibration. While certain frequencies (such as 30 Hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (NRC NAS 1977). A recent study, directed specifically at the effects of low-altitude, high-speed aircraft on structures showed that there is little probability of structural damage occurring as a result of such operations (Sutherland 1989). As noted above, there will be no instances of aircraft sound levels exceeding or reaching 130 dB with replacement of the EA-6B with the EA-18G. In fact, future sound levels will be less with replacement of the EA-6B.

With respect to the potential for aircraft noise effects on the structural components of historical buildings, Wesler (1977), conducted a study of the effects of the scheduled operation of the supersonic Concorde airplane on a restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. There was special concern for the building's windows, since roughly half of the 324 panes were original. Measurements of sound levels and structural vibration levels found no instances of structural damage. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning within the building itself.

In addition, there are no historical data in the *Integrated Cultural Resource Management Plan, Naval Air Station Whidbey Island, Washington* that document damage to historic structures at NAS Whidbey Island caused by noise vibrations from aircraft operations. Therefore, based on past experience, there will be no vibration-related effects on historic properties on the base, within Ebey's Landing National Historic Reserve, or in the adjacent community as a result of the decrease in noise exposure at NAS Whidbey Island.

Potential indirect effects on the rural character of the Ebey's Landing National Historic Preserve would be comprehensively reduced. Most areas in and around OLF Coupeville would experience a reduction in noise under the Proposed Action. Although the Proposed Action would increase noise in a small area over the Ebey's Prairie area south of Coupeville (Figure 3-5), it is difficult to predict whether the casual observer would notice this change and then experience a subsequent change in their perception of the rural nature of Ebey's Prairie. The EA-6B aircraft can be seen and heard from this area under current conditions. The future condition with EA-18G aircraft would change only the predicted level of noise, not the presence of the noise or the presence of the military jet aircraft. Thus, the predicted small area of increased noise would be offset by the overall reductions in total area and population within the 65-dB DNL noise contour.

Therefore, in accordance with the Advisory Council's regulations concerning the criteria of effect, the Navy has concluded that the proposed undertaking would have no effect on historic resources. Similarly, there would be no effects on archaeological resources as a result of the proposed undertaking.

3.3.4.3 Environmental Consequences under Alternative 2: Additional Facilities Construction

The proposed hangar module would be located adjacent Hangar 10. Hangar 10 is not listed in the NRHP, nor is it considered potentially eligible for listing on the NRHP (Dames & Moore 1994). Therefore, in accordance with the Advisory Council's regulations concerning the criteria of effect, the Navy has concluded that the proposed undertaking would have no effect on historic resources.

3.3.4.4 Environmental Consequences under the No-Action Alternative

Under the no-action alternative, the EA-6B would not be replaced and none of the required facilities or functions modifications would occur. The environmental consequences of the no-action alternative are represented as no change from the existing conditions described in Section 3.3.4.1, Affected Environment.

3.4 Cumulative Impacts

Cumulative effects have been defined by the Council on Environmental Quality (CEQ) in 40 CFR 1508.7 as:

> "…impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

Accordingly, a cumulative impacts analysis must identify and define the scope of other actions and their interrelationship with the Proposed Action or its alternatives if there is an overlap in space and time. Cumulative effects are most likely to occur when a proposed action is related to actions that could occur in the same or overlapping geographic location or at the same or a similar time. The following questions were considered in identifying the potential for cumulative impacts in this EA:

- Would the Proposed Action affect or interact with the same resources that have been or would be affected by past, present or reasonably foreseeable actions? If so, would the Proposed Action affect or be affected by the impacts of the other action?

- If an interrelationship exists between the Proposed Action and other past, present, or reasonably foreseeable actions, are there any potential significant impacts not identified when the Proposed Action is considered alone?

3.4.1 Scope of the Cumulative Impact Analysis

For the purposes of this analysis, public documents prepared by federal, state, and local agencies were the primary sources of information on identifying reasonably foreseeable actions. Consequently, the focus of this cumulative impact analysis is on:

- Actions occurring within Navy installations, including NAS Whidbey Island and OLF Coupeville.
- Actions occurring within Island County, and the surrounding counties.

The time frame for cumulative effects would start in 2003 and continue to 2013, when the Proposed Action will have been fully implemented.

3.4.2 Actions Considered in the Cumulative Impact Analysis

Potential cumulative impacts could occur with implementation of the Proposed Action and implementation of the structural improvements and replacements proposed within the Airfield Recapitalization Plan for Ault Field. These programmed improvements and replacements include:

- Renovation and/or modernization of Hangar 5, budgeted for fiscal year (FY) 2007, with construction occurring in 2008-2009;
- Addition and renovation of the Fire Rescue Station, currently being constructed for an occupancy date of March 2006;
- Construction of a new Aircraft Control Tower will be completed for occupancy in November 2004; and
- Demolition of Hangar 1 and addition to Hangar 11, budgeted for FY 2007, with construction occurring in 2008-2009.

In addition, the plan includes recommendations for expansion of the flight line, if required. Potential flight line expansion areas are located at either end of the current flight line.

3.4.3 Cumulative Impacts under Alternative 1: Minor Facilities Modifications

Implementation of any of the proposed projects in the Airfield Recapitalization Plan could have cumulative impacts on existing air quality under Alternative 1. Construction activities associated with these projects would contribute to total air emissions from the station, causing temporary increases in total air emissions from NAS Whidbey Island. Each project would result in different types and amounts of air emissions, but all of these emissions would be similar to those projected for construction of the hangar addition (see Appendix B for construction emission estimates). The construction of a Corrosion Control Hangar (currently unprogrammed) would be expected to require a modification to the air station's existing Title V Operating Permit.

3.4.4 Cumulative Impacts under Alternative 2: Additional Facilities Construction

Implementation of any of the proposed projects in the Airfield Recapitalization Plan could have cumulative impacts on the existing air quality under Alternative 2. Construction activities associated with these projects would contribute to total air emissions from the station, causing temporary increases in total air emissions from NAS Whidbey Island. Each project would result in different types and amounts of air emissions, but all of these emissions would be similar to those projected for construction of the hangar addition (see Appendix B for construction emission estimates). The construction of a Corrosion Control Hangar (currently unprogrammed) would be expected to require a modification to the air station's existing Title V Operating Permit. In addition, implementation of any of the proposed projects during the same time frame as the hangar module would be expected to have cumulative impacts on the ambient noise.

3.4.5 Cumulative Impacts under the No-Action Alternative

Implementation of any of the proposed projects in the Airfield Recapitalization Plan would not cause an accumulation of environmental impacts if the no-action alternative were implemented.

3.5 Unavoidable Adverse Effects

Unavoidable adverse impacts associated with the Proposed Action include the following:

- Replacement of the EA-6B with the EA-18G under Alternatives 1 and 2 would increase the noise exposure within two small geographic areas in Island County. Although the overall land area within the greater than 75-dB DNL noise zone around Ault Field decreases, a small portion of land area northeast of Ault Field that was not exposed to the greater than 75-dB DNL noise zone in CY 2003 would be exposed to the greater than 75-dB DNL noise zone in CY 2013. In addition, a small increase in the land area within the 65- to 70-dB DNL noise zone would occur on the west side of OLF Coupeville, within Ebey's Landing National Historic Reserve.

  Land within these two small geographic areas is zoned for agricultural uses. Based on a field survey, the area where the CY 2013 75-dB DNL noise contour extends beyond the CY 2003 75-dB DNL north of Ault Field includes forested lands, approximately three single-unit residences in an "upscale" residential development in the early stages of development, a commercial retail establishment with a small arms shooting range, and cattle and horse pastures. The area where the CY 2013 65-dB DNL noise contour extends beyond the CY 2003 65-dB DNL noise contour west of OLF Coupeville includes agriculture and grasslands, forested land, approximately five single-unit residences, a commercial retail establishment, and agricultural structures associated with the Sherman Farms Dairy. This area west of OLF Coupeville is also part of Ebey's Landing National Historic Reserve.

  However, replacement of the EA-6B with the EA-18G results in a 28% reduction in overall land area within the noise contours for Ault Field and a 9% reduction in overall land area within the noise contours for OLF Coupeville, including other portions of Ebey's Landing National Historic Reserve. Implementation of the Proposed Action will result in a 36% reduction in the population exposed to aircraft noise greater than 65 dB DNL noise contour around Ault Field, and a 16% reduction in the population exposed to aircraft noise greater than 65 dB DNL around OLF Coupeville.

  In addition, potential indirect effects on the rural character of the Ebey's Landing Historic Preserve would be comprehensively reduced. Most areas in and around OLF Coupeville would experience a reduction in noise under the Proposed Action. The EA-6B aircraft can be seen and heard from this area under current conditions. The future condition with EA-18G aircraft would change only the predicted level of noise, not the presence of the noise or the presence of the military jet aircraft. Thus, the predicted small area of increased noise would be offset by the overall reductions in total area and population within the 65-dB DNL noise contour. Overall, flight operations are projected to decrease, and no vibrations would impact any historic structures; therefore, the Proposed Action would have no effect on the historic reserve.

- Under Alternatives 1 and 2, there would be a change in the air emissions associated with replacing the EA-6B with the EA-18G. Total annual mobile source emissions of CO, NO_X, and VOCs are projected to increase, and total annual mobile source emissions of SO_2 and PM_{10} are projected to decrease. Stationary source emissions of CO from the test cell are projected to increase, and emissions of VOCs, NO_X, SO_2, and PM_{10} from the test cell are projected to decrease. In addition, under Alternative 2, construction of the 20,000-square-foot hangar addition would generate fugitive dust and equipment exhaust emissions for the duration of the 6-month construction period.

- Replacing the EA-6B with the EA-18G will result in an overall decrease in the number of VAQ aircraft and associated personnel stationed at NAS Whidbey Island. It is estimated that 1,106 military personnel and their dependents will be reassigned from NAS Whidbey Island to outside the local area. This reduction in personnel will have minor impacts on the on-station population and the regional population because no change in civilian personnel is expected and military personnel currently assigned to support the EA-6B will be reassigned.

3.6 Relationship Between Short-Term Uses of the Environment and the Enhancement of Long-Term Productivity

Under Alternatives 1 and 2, short-term uses of the environment include the use of fossil fuel to power equipment for modifications of facilities at NAS Whidbey Island and expenditures of public funds/resources to implement the aircraft replacement. These short-term uses would be offset by the productive maintenance of the existing expertise of the AEA community at NAS Whidbey Island. The EA-18G will serve as the replacement for the aging fleet of EA-6B aircraft. Replacement of the aircraft and upgrades to facilities and functions would improve the long-term productivity of the Navy, specifically the AEA community. The Proposed Action would result in improvements to the aircraft but initially would require additional training of the aircrew and maintenance personnel, and continued testing and maintenance of the aircraft and its components.

3.7 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be reversed except after an extremely long period of time. Replacement of the EA-6B with the EA-18G at NAS Whidbey Island and implementation of the Proposed Action would result in irreversible commitments of personnel, public funds, and capital resources to NAS Whidbey Island for the AEA community.

The irreversible commitment of resources to upgrade facilities and functions include use of energy resources to operate construction equipment and commitment of public funds for aircraft replacement, training, and maintenance.

3.8 Relationship of the Proposed Action to Federal, State, and Local Plans, Policies, and Controls

Table 3-27 summarizes the laws and implementing regulations applicable to the Proposed Action.

Table 3-27 Compliance of the Proposed Action with the Objectives of Federal, State, and Local Plans, Policies, and Controls

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
National Environmental Policy Act (NEPA)(42 United States Code [U.S.C.] § 4321 *et seq*.) Department of the Navy Procedures for Implementing NEPA (32 Code of Federal Regulations [CFR] 775)	U.S. Navy	This EA has been prepared in accordance with CEQ Regulations implementing NEPA and Department of the Navy NEPA procedures. The preparation of this EA and the provision for its review are being conducted in compliance with NEPA.
Coastal Zone Management Act (CZMA)(16 CFR § 1451 *et seq*.)	Washington Department of Ecology	The Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the Washington Coastal Zone Management Program.
Clean Water Act (CWA), Section 401/402 (§§ 401-402, 33 U.S.C. § 1251 *et seq*.), section 404 (§ 404, 33 U.S.C. § 1251 *et seq*.)	U.S. Environmental Protection Agency (USEPA)/U.S. Army Corps of Engineers (USACE)	This project does not involve a discharge of materials and does not trigger the requirements of Sections 404/401 of the CWA.

Table 3-27 Compliance of the Proposed Action with the Objectives of Federal, State, and Local Plans, Policies, and Controls (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Clean Air Act (CAA), as amended (42 USC § 7401 *et seq*.)	USEPA	In accordance with CAA regulations, the Proposed Action would not compromise air quality attainment status in Washington or conflict with attainment and maintenance goals established in its State Implementation Plan. Island County is an attainment area; therefore, a CAA conformity determination is not required.
Endangered Species Act (16 USC § 1531)	U.S. Fish and Wildlife Service (USFWS), NOAA Fisheries	The Proposed Action would have no effect on any listed species.
Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898, 59 Federal Register 7629 [Section 1-101])	U.S. Navy	The Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority and low-income populations.
EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (EO 13045, 62 Federal Register 1985)	U.S. Navy	Children would not be disproportionately exposed to environmental health risks or safety risks by the Proposed Action. In fact, by 2013, two schools currently affected by aircraft noise would no longer be located within the greater than 65-dB DNL noise contour.
National Historic Preservation Act (§ 106, 16 USC 470 *et seq*.)	U.S. Navy	The Proposed Action would have no effect on historic properties at NAS Whidbey Island or other historic properties such as the Ebey's Landing National Historic Reserve.

Table 3-27 Compliance of the Proposed Action with the Objectives of Federal, State, and Local Plans, Policies, and Controls (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186, 66 Federal Register 11)	U.S. Navy	The Proposed Action would have no effect on migratory bird populations.

4 References

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A Flight Operations Data

Table A.1 2003 Flight Operations at NAS Whidbey Island and OLF Coupeville

Tenant Name	Aircraft Type	Operation Type	Description	CY2003 Operations 0700-2200	2200-0700	Total
CVWP	EA-6B	Departure	Departure	3,935	241	4,176
			VFR to OLF Coupeville - Interfacility	531	109	640
			Total All Departures	**4,466**	**350**	**4,816**
		Arrival	Overhead-Break	1,860	136	1,996
			VFR from OLF Coupeville - Interfacility	531	109	640
			TACAN	411	25	436
			IFR Full-Stop	1,643	101	1,744
			Total All Arrivals	**4,445**	**371**	**4,816**
		Closed Pattern	FCLP	18,983	3,967	22,950
			Touch and Go	9,160	433	9,593
			Depart and ReEnter	238	17	255
			GCA Box	2,032	1,832	3,864
			Total All Closed Patterns	**30,413**	**6,249**	**36,662**
			GRAND TOTALS	**39,324**	**6,970**	**46,294**
CPRW	P-3	Departure	LO-TACAN	4,289	81	4,370
			IFR	3,668	145	3,813
			Total All Departures	**7,957**	**226**	**8,183**
		Arrival	VFR	4,290	81	4,371
			LO-TACAN	1,834	72	1,906
			IFR Full-Stop	1,834	72	1,906
			Total All Arrivals	**7,958**	**225**	**8,183**
		Closed Pattern	Touch and Go	12,867	244	13,111
			GCA Box	4,661	175	4,836
			Total All Closed Patterns	**17,528**	**419**	**17,947**
			GRAND TOTALS	**33,443**	**870**	**34,313**
TRANSPORT	C-9	Departure	Departure	211	114	325
		Arrival	Straight-In Arrival	211	114	325
			GRAND TOTALS	**422**	**227**	**649**
STATION	C-12	Departure	Departure	65	35	100
		Arrival	Straight-In Arrival	65	35	100
			GRAND TOTALS	**129**	**70**	**199**
TRANSIENT	Transient	Departure	Departure	164	88	252
		Arrival	Straight-In Arrival	164	88	252
			GRAND TOTALS	**328**	**176**	**504**
			Total LTO Operations (for GSE calculations)			**13,675**

Tenant Name	Aircraft Type	Operation Type	Description	CY2003 Operations 0700-2200	2200-0700	Total
CVWP	EA-6B	Closed Pattern	FCLP	6,390	1,292	7,682
			Total All Closed Patterns	6,390	1,292	7,682

Note: Each FCLP and T&G operation is counted as two operations, one arrival and one departure. For air quality purposes, they are counted as one operation; therefore, total FCLP and T&G operations listed on the air quality calculation tables are one-half the operations listed in this table.

Source: Wyle Laboratories, Inc. 2004 (based on data provide by Whidbey personnel, August 2004).

Table A.2 2013 Projected Flight Operations at NAS Whidbey Island and OLF Coupeville

Tenant Name	Aircraft Type	Operation Type	Description	CY2013 Operations 0700-2200	2200-0700	Total
CVWP	EA-18G	Departure	Departure	3,749	229	3,978
			VFR to OLF Coupeville - Interfacility	506	104	610
			Total All Departures	**4,255**	**333**	**4,588**
		Arrival	Overhead-Break	1,772	129	1,901
			VFR from OLF Coupeville - Interfacility	506	104	610
			TACAN	391	24	415
			IFR Full-Stop	1,566	96	1,662
			Total All Arrivals	**4,235**	**353**	**4,588**
		Closed Pattern	FCLP	15,122	3,160	18,282
			Touch and Go	8,727	412	9,139
			Depart and ReEnter	226	17	243
			GCA Box	1,936	1,745	3,681
			Total All Closed Patterns	**26,011**	**5,334**	**31,345**
			GRAND TOTALS	**34,501**	**6,020**	**40,521**
CPRW	P-3	Departure	LO-TACAN	4,289	81	4,370
			IFR	3,668	145	3,813
			Total All Departures	**7,957**	**226**	**8,183**
		Arrival	VFR	4,290	81	4,371
			LO-TACAN	1,834	72	1,906
			IFR Full-Stop	1,834	72	1,906
			Total All Arrivals	**7,958**	**225**	**8,183**
		Closed Pattern	Touch and Go	12,867	244	13,111
			GCA Box	4,661	175	4,836
			Total All Closed Patterns	**17,528**	**419**	**17,947**
			GRAND TOTALS	**33,443**	**870**	**34,313**
TRANSPORT	C-9	Departure	Departure	211	114	325
		Arrival	Straight-In Arrival	211	114	325
			GRAND TOTALS	**422**	**227**	**649**
TRANSIENT	Transient	Departure	Departure	164	88	252
		Arrival	Straight-In Arrival	164	88	252
			GRAND TOTALS	**328**	**176**	**504**
STATION	C-12		C-12 will not operate in 2013			**0**
			Total LTO Operations (for GSE calculations)			**13,348**

Tenant Name	Aircraft Type	Operation Type	Description	CY2013 Operations 0700-2200	2200-0700	Total
CVWP	EA-18G	Closed Pattern	FCLP	5,091	1,029	6,120
			Total All Closed Patterns	**5,091**	**1,029**	**6,120**

Note: Each FCLP and T&G operation is counted as two operations, one arrival and one departure. For air quality purposes, they are counted as one operation; therefore, total FCLP and T&G operations listed on the air quality calculation tables are one-half the operations listed in this table.

Source: Wyle Laboratories, Inc. 2004 (based on data provide by Whidbey personnel, August 2004).

Table A.3 2003 Existing and Projected Maintenance Testing Operations at NAS Whidbey Island

Note: Any C-9, C-12 and Transient Aircraft Maintenance will not be modeled.

Aircraft Type	Maintenance Operation	Engine Mode	Engine Power Setting (N2)	No. of Engines in Use	Operations Per year	Time-In-Mode per Engine (min)
EA-6B	Low Power	Main Engine Run	Idle (60%)	1	2592	15
			75%	1	2592	5
	Low Power/Water Wash	Main Engine Run	Idle (60%)	2	1080	25
			75%	2	1080	8
	High Power	Engine Start/Taxi	Idle (60%)	2	360	16
		Intermediate Power	70%	2	360	15
		High Power	98%	2	360	10

Aircraft Type	Maintenance Operation	Engine Mode	Engine Power Setting (N1)	No. of Engines in Use	Operations Per year	Time-In-Mode per Engine (min)
EA-18G	Water Wash	Main Engine Run	Ground Idle	1	57	10
	Low Power- 2 Engines	Main Engine Run	Ground Idle	2	701	15
			80%	2	701	15
	High Power	Main Engine Run	Ground Idle	2	34	10
			80%	2	34	10
			90%	2	34	10
			MIL 96%	2	34	10
			AB 97%	2	34	3

Aircraft Type	Maintenance Operation	Location	Engine Power Setting (ESHP)	No. of Engines in Use	Operations Per year	Time per Operation Type (min)
P-3	Low Power	Flight Line	1,000	1	520	15
	Prop Dynamic Balancing	Flight Line (50%)	1,500	1	40	15
		High-Power Area (50%)	1,500	1	40	15
	Out-Of-Phase Turn	Flight Line	250 (Low Idle)	4	42	30
			450 (Normal Idle)	4	42	10
			1,000	4	42	10
	High Power	Red Label Delta	1,500	2 (2 idling)	50	15
			2,750	2 (2 idling)	50	15
			4,300	2 (2 idling)	50	10
	High Power	Red Label Delta	1,500	2 (2 idling)	50	15
			2,750	2 (2 idling)	50	15
			4,300	2 (2 idling)	50	10

Test Cell (Engine/ Aircraft Type)	Maintenance Operation	Engine Power Setting	No. of Engines in Use	Operations Per year	Time-In-Mode per Engine (min)
J52-P-408A (EA-6B)	Engine Test Cell	Gr Idle (56%) N2	1	174	25
		76% N2	1	174	10
		90% N2	1	174	10
		97% N2	1	174	10
		100% N2	1	174	5
F414-GE-400 (EA-18G)	Engine Test Cell	Gr Idle (56% N2)	1	71	9
		80% N2	1	71	51
		97% N2 (A/B)	1	71	3

Source: Wyle Laboratories, Inc. 2004.

Table A.4 Historic Flight Operations

Table 3-1. Historical Flight Operations for NAS Whidbey Island and OLF Coupeville - 1976 to 2002

Year	NAS Whidbey Island Ault Field			OLF Coupeville	Total	
	FCLP	OTHER	TOTAL	FCLP	FCLP	OPERATIONS
	(a)	(b)	(a+b)	(d)	(a+d)	(a+b+d)
1976	29,245	90,948	120,193	17,810	47,055	138,003
1977	27,064	61,449	88,513	17,748	44,812	106,261
1978	31,308	95,896	127,204	24,378	55,686	151,582
1979	17,720	78,963	96,683	20,282	38,002	116,965
1980	25,102	79,000	104,102	12,190	37,292	116,292
1981	26,443	62,805	89,248	16,848	43,291	106,096
1982	26,696	77,639	104,335	14,472	41,168	118,807
1983	36,418	82,019	118,437	11,782	48,200	130,219
1984	32,400	80,842	113,242	12,726	45,126	125,968
1985	29,185	72,267	101,452	13,934	43,119	115,386
1986	27,475	77,529	105,004	22,232	49,707	127,236
1987	27,202	110,480	137,682	30,350	57,552	168,032
1988	47,734	101,396	149,130	30,442	78,176	179,572
1989	50,186	87,850	138,036	22,596	72,782	160,632
1990	51,758	104,582	156,340	32,080	83,838	188,420
1991	43,662	90,632	134,294	27,088	70,750	161,382
1992	54,516	84,515	139,031	25,844	80,360	164,875
1993	36,422	79,551	115,973	21,324	57,746	137,297
1994	36,472	74,990	111,462	21,628	58,100	133,090
1995	30,494	74,936	105,430	19,854	50,348	125,284
1996	22,832	86,895	109,727	13,066	35,898	122,793
1997	30,740	88,093	118,833	9,736	40,476	128,569
1998	19,516	77,433	96,949	6,808	26,324	103,757
1999	17,194	77,014	94,208	6,752	23,946	100,960
2000	16,536	84,424	100,960	6,378	22,914	107,338
2001	16,132	79,857	95,989	3,568	19,700	99,557
2002	17,090	77,069	94,159	4,100	21,190	98,259

Source: McCarter, 12 Aug 04

Source: Wyle Laboratories, Inc. 2004.

B Air Quality Calculations Tables

B1 Mobile and Stationary Source Emissions

Emission Factors

B.1 Emission Factors for Operations of F/A-18G Aircraft
B.2 Emissions Factors for Operations of EA-6B Aircraft
B.3 Modal Emission Rates for Other Aircraft at NAS Whidbey Island
B.4 Projected Emissions from In-frame Maintenance Run Up Operations of EA-18G Aircraft
B.5 Existing Emissions from In-frame Maintenance Run-up Operations of EA-6B Aircraft
B.6 Estimated Emissions from In-frame Maintenance Run-up Operations of P-3 Aircraft

Aircraft Emission Total Summaries

B.7 Summary of Existing Mobile Air Emissions
B.8 Summary of Projected Mobile Air Emissions

Other Mobile Source Emissions

B.9 Emission Factors for Privately Owned Vehicles, NAS Whidbey Island
B.10 Residential Distribution of NAS Whidbey Island Personnel
B.11 Projected Criteria Air Pollutant Emissions from Privately Owned Vehicles, NAS Whidbey Island
B.12 Annual Emissions from Ground Support Equipment Operations, 2003-2013

Test Cell Emissions

B.13 Projected Emissions Rates from Aircraft Engine Test Cell Operations (EA-18G) (Single Engine in Test Cells)
B.14 Existing Emissions for Aircraft Engine Test Cell Operations (EA-6B) (Single Engine in Test Cells)

TABLE B.1 EMISSION FACTORS FOR OPERATIONS OF F/A-18G AIRCRAFT

Flight Operation and Flight Mode		Engine Power Setting[1]	No. of Engines in Use	Time-in-Mode per Engine (min)	Fuel Flow Rate per Engine (lb/hr)	Fuel Used (lbs)	Engine(s): F414-GE500 (2) Emission Indexes (pounds per 1,000 pounds fuel) EI CO	EI NO_x	EI HC	EI SO_2	EI PM_{10}	APU Type: GTC 36-200 Emissions from Single Landing and Take Off (lb/operations) CO	NO_x	HC	SO_2	PM_{10}
Departure																
	APU Use	ON	1	5.0	197	16.42	2.00	6.25	0.25	0.40	0.22	0.033	0.103	0.004	0.007	0.004
	Start/Warm-up	G Idle	2	15.0	723	361.50	93.26	3.23	59.39	0.40	13.39	33.713	1.168	21.469	0.145	4.840
	Unstick	75% N2	2	0.3	1,421	14.21	26.09	4.85	5.37	0.40	10.49	0.371	0.069	0.076	0.006	0.149
	Taxi Out	G Idle	2	5.0	723	120.50	93.26	3.23	59.39	0.40	13.39	11.238	0.389	7.156	0.048	1.613
	Engine Run-up	80% N2	2	0.5	2,337	38.95	5.34	7.08	0.34	0.40	8.47	0.208	0.276	0.013	0.016	0.330
	Takeoff	Max AB	2	0.5	35,763	596.05	274.97	9.67	4.87	0.40	No Data	163.896	5.764	2.903	0.238	0.000
	Takeoff - No A/B	95% N2	2	0.5	9,225	153.75	0.69	28.11	0.12	0.40	3.14	0.106	4.322	0.018	0.062	0.483
	Climbout	95% N2	2	1.0	9,225	307.50	0.69	28.11	0.12	0.40	3.14	0.212	8.644	0.037	0.123	0.966
					Single Departure Totals	**1455.1**						**209.67**	**16.41**	**31.66**	**0.58**	**7.90**
					Single Departure Totals, no AB	**1012.8**						**45.88**	**14.97**	**28.77**	**0.41**	**8.38**
Arrival straight in																
	Approach	85% N2	2	3.0	4,049	404.90	0.89	11.58	0.12	0.4	6.31	0.360	4.689	0.049	0.162	2.555
	On Runway(WOW)	G Idle	2	1.0	723	24.10	93.26	3.23	59.39	0.4	13.39	2.248	0.078	1.431	0.010	0.323
	Unstick	75% N2	2	0.3	1,421	14.21	26.09	4.85	5.37	0.4	10.49	0.371	0.069	0.076	0.006	0.149
	Taxi In/ shut down	G Idle	2	8.0	723	192.80	93.26	3.23	59.39	0.4	13.39	17.981	0.623	11.450	0.077	2.582
	Hot Refuel	G Idle	2	15.0	723	361.50	93.26	3.23	59.39	0.4	13.39	33.713	1.168	21.469	0.145	4.840
					Single Straight in Arrival Totals	**997.5**						**54.67**	**6.63**	**34.48**	**0.40**	**10.45**
					Single Straight in Arrival Totals, no hotfuel	**636.0**						**20.96**	**5.46**	**13.01**	**0.25**	**5.61**
Arrival /w break																
	Approach to break	90% N2	2	1.0	6,505	216.8	0.70	18.82	0.12	0.40	4.48	0.152	4.081	0.026	0.087	0.971
	Break	F Idle	2	0.5	880	14.7	69.91	3.59	34.50	0.40	12.52	1.025	0.053	0.506	0.006	0.184
	Circle	80% N2	2	1.0	2,337	77.9	5.34	7.08	0.34	0.40	8.47	0.416	0.552	0.026	0.031	0.660
	Approach	80% N2	2	0.5	2,337	39.0	5.34	7.08	0.34	0.40	8.47	0.208	0.276	0.013	0.016	0.330
	On Runway(WOW)	G Idle	2	1.0	723	24.1	93.26	3.23	59.39	0.40	13.39	2.248	0.078	1.431	0.010	0.323
	Unstick	75% N2	2	0.3	1,421	14.2	26.09	4.85	5.37	0.40	10.49	0.371	0.069	0.076	0.006	0.149
	Taxi In	G Idle	2	8.0	723	192.8	93.26	3.23	59.39	0.40	13.39	17.981	0.623	11.450	0.077	2.582
	Hot Refuel	G Idle	2	15.0	723	361.5	93.26	3.23	59.39	0.40	13.39	33.713	1.168	21.469	0.145	4.840
					Single Arrival with Break w/ hot refuel	**941.0**						**56.11**	**6.90**	**35.00**	**0.38**	**10.04**
					Single Arrival with Break w/o hot refuel	**579.5**						**22.40**	**5.73**	**13.53**	**0.23**	**5.20**
					Single F/A-18E/F LTO with Straight In Arrival, w/ hot refuel, w/AB	**2,453**						**264.34**	**23.04**	**66.14**	**0.98**	**18.35**
					Single F/A-18E/F LTO with Straight In Arrival, w/o hot refuel, w/ AB	**2,091**						**230.63**	**21.87**	**44.67**	**0.84**	**13.51**
					Single F/A-18E/F LTO with Straight In Arrival, w/ hot refuel, w/o AB	**2,010**						**100.55**	**21.60**	**63.25**	**0.80**	**18.83**
					Single F/A-18E/F LTO with Straight In Arrival, w/o hot refuel, w/o AB	**1,649**						**66.84**	**20.43**	**41.78**	**0.66**	**13.99**
					Single F/A-18E/F LTO with Break Arrival, w/ hot refuel, w/AB	**2,396**						**265.78**	**23.31**	**66.66**	**0.96**	**17.94**
					Single F/A-18E/F LTO with Break Arrival, w/o hot refuel, w/ AB	**2,035**						**232.07**	**22.14**	**45.19**	**0.81**	**13.10**
					Single F/A-18E/F LTO with Break Arrival, w/ hot refuel, w/o AB	**1,954**						**101.99**	**21.87**	**63.77**	**0.78**	**18.42**
					Single F/A-18E/F LTO with Break Arrival, w/o hot refuel, w/o AB	**1,592**						**68.28**	**20.70**	**42.30**	**0.64**	**13.58**
Data source: AESO Memorandum Report No. 9815, Revision E, Nov 2002																
Touch-and Go (T&G) and Field Carrier Landing Practice (FCLP)																
	Approach	85% N2	2	1.0	4,049	134.97	0.89	11.58	0.12	0.40	6.31	0.120	1.563	0.016	0.054	0.852
	Climbout	95% N2	2	0.5	9,225	153.75	0.69	28.11	0.12	0.40	3.14	0.106	4.322	0.018	0.062	0.483
	Circle	85% N2	2	2.0	4,049	269.93	0.89	11.58	0.12	0.40	6.31	0.240	3.126	0.032	0.108	1.703
					Single Touch-and Go or Field Carrier Landing Practice Total	**558.65**						**0.47**	**9.01**	**0.07**	**0.22**	**3.04**
Ground Control Approach (GCA) Box																
	Approach	85% N2	2	1.0	4,049	134.97	0.89	11.58	0.12	0.40	6.31	0.120	1.563	0.016	0.054	0.852
	Climbout	95% N2	2	1.0	9,225	307.50	0.69	28.11	0.12	0.40	3.14	0.212	8.644	0.037	0.123	0.966
	Circle	85% N2	2	5.0	4,049	674.83	0.89	11.58	0.12	0.40	6.31	0.601	7.815	0.081	0.270	4.258
					Single Ground Control Approach Total	**1,117.30**						**0.93**	**18.02**	**0.13**	**0.45**	**6.08**

Data source: AESO Memorandum Report No. 9933B, Nov 2002

TABLE B.2 EMISSIONS FACTORS FOR OPERATIONS OF EA-6B AIRCRAFT

Flight Operation and Flight Mode		Engine Power Setting[1]	No. of Engines in Use[1]	Time-in-Mode per Engine[1] (min)	Fuel Flow Rate per Engine[2] (lb/hr)	Fuel Used[3] (lbs)	Engine(s): J52-P-408A (2) Emission Indexes[2] (pounds per 1,000 pounds fuel					APU Type: None Emissions from Single Landing and Take Off[4] (lb/Operation)				
							EI CO	EI NO_x	EI HC	EI SO_2	EI PM_{10}	CO	NO_x	HC	SO_2	PM_{10}
Landing and Take Off (LTO) Operations with Straight-in Arrival																
Departure																
	Start/Warm-up	Idle	2	15.0	779	389.50	55.96	2.38	28.33	0.40	19.94	21.80	0.93	11.03	0.16	7.77
	Unstick	70% N2	2	0.3	1,825	18.25	18.09	4.30	2.40	0.40	15.41	0.33	0.08	0.04	0.01	0.28
	Taxi Out	Idle	2	5.0	779	129.83	55.96	2.38	28.33	0.40	19.94	7.27	0.31	3.68	0.05	2.59
	Engine Run-up	85% N2	2	0.5	4,227	70.45	5.19	6.77	0.84	0.40	10.48	0.37	0.48	0.06	0.03	0.74
	Takeoff	95% N2	2	0.5	7,401	123.35	2.10	10.05	0.60	0.40	7.18	0.26	1.24	0.07	0.05	0.89
	Climbout	95% N2	2	1.0	7,401	246.70	2.10	10.05	0.60	0.40	7.18	0.52	2.48	0.15	0.10	1.77
					Single Departure Totals	978.08						30.53	5.51	15.04	0.39	14.03
Arrival straight in																
	Approach	85% N2	2	5.0	4,227	704.50	5.19	6.77	0.84	0.40	10.48	3.66	4.77	0.59	0.28	7.38
	On runway (WoW)	Idle	2	1.0	779	25.97	55.96	2.38	28.33	0.40	19.94	1.45	0.06	0.74	0.01	0.52
	Unstick	70% N2	2	0.3	1,825	18.25	18.09	4.30	2.40	0.40	15.41	0.33	0.08	0.04	0.01	0.28
	Taxi In/Shut down	Idle	2	10.0	779	259.67	55.96	2.38	28.33	0.40	19.94	14.53	0.62	7.36	0.10	5.18
	Hot Refuel[1]	Idle	1	20.0	779	259.67	55.96	2.38	28.33	0.40	19.94	14.53	0.62	7.36	0.10	5.18
					Single Straight In Arrival Totals	1268.05						34.50	6.15	16.08	0.51	18.54
					Single Straight In Arrival Totals, no hot refuel	1008.38						19.97	5.53	8.73	0.40	13.36
					Single EA-6B LTO with Straight in Arrival	**2246.13**						**65.04**	**11.66**	**31.12**	**0.90**	**32.57**
					Single EA-6B LTO with Straight in Arrival, no hot refuel	**1986.47**						**50.51**	**11.04**	**23.77**	**0.79**	**27.39**
Landing and Take Off (LTO) Operations with Break Arrival																
Departure																
	Start/Warm-up	Idle	2	15.0	779	389.50	55.96	2.38	28.33	0.40	19.94	21.80	0.93	11.03	0.16	7.77
	Unstick	70% N2	2	0.3	1,825	18.25	18.09	4.30	2.40	0.40	15.41	0.33	0.08	0.04	0.01	0.28
	Taxi Out	Idle	2	5.0	779	129.83	55.96	2.38	28.33	0.40	19.94	7.27	0.31	3.68	0.05	2.59
	Engine Run-up	85% N2	2	0.5	4,227	70.45	5.19	6.77	0.84	0.40	10.48	0.37	0.48	0.06	0.03	0.74
	Takeoff	95% N2	2	0.5	7,401	123.35	2.10	10.05	0.60	0.40	7.18	0.26	1.24	0.07	0.05	0.89
	Climbout	95% N2	2	1.0	7,401	246.70	2.10	10.05	0.60	0.40	7.18	0.52	2.48	0.15	0.10	1.77
					Single Departure Totals	978.08						30.53	5.51	15.04	0.39	14.03
Arrival /w break																
	Approach to break	90% N2	2	2.0	5,594	372.93	3.33	8.18	0.70	0.40	8.83	1.24	3.05	0.26	0.15	3.29
	Break	60% N2	2	0.5	1,042	17.37	38.61	3.49	9.54	0.40	18.70	0.67	0.06	0.17	0.01	0.32
	Circle	80% N2	2	1.0	3,195	106.50	7.99	5.71	1.09	0.40	12.12	0.85	0.61	0.12	0.04	1.29
	Approach	85% N2	2	1.0	4,227	140.90	5.19	6.77	0.84	0.40	10.48	0.73	0.95	0.12	0.06	1.48
	On runway (WoW)	Idle	2	1.0	779	25.97	55.96	2.38	28.33	0.40	19.94	1.45	0.06	0.74	0.01	0.52
	Unstick	70% N2	2	0.3	1,825	18.25	18.09	4.30	2.40	0.40	15.41	0.33	0.08	0.04	0.01	0.28
	Taxi In/Shut down	Idle	2	10.0	779	259.67	55.96	2.38	28.33	0.40	19.94	14.53	0.62	7.36	0.10	5.18
	Hot Refuel[1]	Idle	1	20.0	779	259.67	55.96	2.38	28.33	0.40	19.94	14.53	0.62	7.36	0.10	5.18
					Single Arrival w/ Break Totals	1201.25						34.34	6.05	16.15	0.48	17.54
					Single Arrival w/ Break, no hot refuel Totals	941.58						19.81	5.43	8.80	0.38	12.36
					Single EA-6B LTO with Break at Arrival	**2179.33**						**64.87**	**11.56**	**31.19**	**0.87**	**31.57**
					Single EA-6B LTO with Break Arrival, no hot refuel	**1919.67**						**50.34**	**10.94**	**23.83**	**0.77**	**26.39**
[1]Time in Mode Source: CDR Miller, NAS Oceana, 1997 Data source: AESO Memorandum Report No. 9917, Revision B, Aug 2002																
Touch-and Go (T&G) and Field Carrier Landing Practice (FCLP)																
	Approach	85% N2	2	1	4,227	140.90	5.19	6.77	0.84	0.4	10.48	0.73	0.95	0.12	0.06	1.48
	Climbout	95% N2	2	1	7401	246.70	2.1	10.05	0.6	0.4	7.18	0.52	2.48	0.15	0.10	1.77
	Circle	80% N2	2	2	3195	213.00	7.99	5.71	1.09	0.4	12.12	1.70	1.22	0.23	0.09	2.58
					Single Touch-and Go or Field Carrier Landing Practice Total	**600.60**						**2.95**	**4.65**	**0.50**	**0.24**	**5.83**
Ground Control Approach (GCA) Box																
	Approach	85% N2	2	2	4,227	281.80	5.19	6.77	0.84	0.4	10.48	1.46	1.91	0.24	0.11	2.95
	Climbout	95% N2	2	1	7401	246.70	2.1	10.05	0.6	0.4	7.18	0.52	2.48	0.15	0.10	1.77
	Circle	80% N2	2	5	3195	532.50	7.99	5.71	1.09	0.4	12.12	4.25	3.04	0.58	0.21	6.45
					Single Ground Control Approach Total	**1061.00**						**6.24**	**7.43**	**0.97**	**0.42**	**11.18**

Data source: AESO Memorandum Report No. 9941A, August 2002

TABLE B.3 MODAL EMISSION RATES FOR OTHER AIRCRAFT AT NAS WHIDBEY ISLAND

Aircraft (Engine Model)	Mode	Engine Power Setting	Time in Mode (minutes)	Fuel Flow ((lb/hr)/eng)	Fuel Flow ((lb/min)/eng)	Engines	Emission Index (lb /1000 lb fuel) VOC	NOx	CO	SO2	PM10	Modal Emission Rates (lb/mode) VOC (1)	NOx	CO	SO2	PM10 (2)
P-3 (T56-A-14) APU type: GTCP 95-2/3	APU	100%	120.0	293	4.88	1	0.42	5.65	3.20	0.40	0.22	0.25	3.31	1.88	0.23	0.13
	Start/Warm up	L/S Idle	9.0	599	9.98	3	22.32	3.53	30.11	0.40	3.97	6.02	0.95	8.12	0.11	1.07
	Start/Warm up	H/S Idle	13.0	756	12.60	1	1.42	6.35	5.65	0.40	3.97	0.23	1.04	0.93	0.07	0.65
	Unstick	24% shp	0.2	1000	16.67	4	0.61	7.61	2.65	0.40	3.97	0.01	0.10	0.04	0.01	0.05
	Taxi Out/Idle	L/S Idle	10.0	599	9.98	3	22.32	3.53	30.11	0.40	3.97	6.68	1.06	9.02	0.12	1.19
	Taxi Out/Idle	H/S Idle	10.0	756	12.60	1	1.42	6.35	5.65	0.40	3.97	0.18	0.80	0.71	0.05	0.50
	Run up	Military	0.3	2219.0	36.98	4	0.16	10.45	0.65	0.40	3.97	0.01	0.46	0.03	0.02	0.18
	Take Off	Military	0.5	2219.0	36.98	4	0.16	10.45	0.65	0.40	3.97	0.01	0.77	0.05	0.03	0.29
	Climbout	74% shp	3.0	1800.0	30.00	4	0.21	9.83	0.94	0.40	3.97	0.08	3.54	0.34	0.14	1.43
	Approach	37% shp	10.0	1200.0	20.00	4	0.41	8.43	1.82	0.40	3.97	0.33	6.74	1.46	0.32	3.18
	On Runway	H/S Idle	1.0	756	12.60	4	1.42	6.35	5.65	0.40	3.97	0.07	0.32	0.28	0.02	0.20
	Taxi In/Idle	L/S Idle	12.0	599	9.98	4	22.32	3.53	30.11	0.40	3.97	10.70	1.69	14.43	0.19	1.90
	APU	100%	15.0	293	4.88	1	0.42	5.65	3.20	0.40	0.22	0.03	0.41	0.23	0.03	0.02
	T&G Level [1,2]	37% shp	2.0	1200.0	20.00	4	0.41	8.43	1.82	0.40	3.97	0.07	1.35	0.29	0.06	0.64
	GCA Box [1]	37% shp	5.0	1200.0	20.00	4	0.41	8.43	1.82	0.40	3.97	0.16	3.37	0.73	0.16	1.59
											Full LTO	**24.59**	**21.21**	**37.50**	**1.34**	**10.79**
											Touch and Go [3]	**0.47**	**1.75**	**0.69**	**0.47**	**1.04**
											GCA Box [3]	**0.57**	**3.78**	**1.13**	**0.56**	**1.99**
Data source: AESO Memorandum Report 9911B April 2000																
C-12/TC-4 (PT6A-41)	Start/Warm up	G Idle	10.00	138.0	2.30	2	8.98	3.05	29.78	0.40	4.20	0.41	0.14	1.37	0.02	0.19
	Unstick	71.2%	0.25	161.0	2.68	2	3.92	3.26	23.12	0.40	4.20	0.01	0.00	0.03	0.00	0.01
	Taxi Out/Idle	63.2%	5.00	148.0	2.47	2	6.21	3.13	28.36	0.40	4.20	0.15	0.08	0.70	0.01	0.10
	Run up	93.8%	0.50	401.0	6.68	2	0.11	6.53	0.76	0.40	4.20	0.00	0.04	0.01	0.00	0.03
	Take Off	100.0%	0.50	540.0	9.00	2	0.11	8.32	0.75	0.40	4.20	0.00	0.07	0.01	0.00	0.04
	Climbout	100.0%	2.00	540.0	9.00	2	0.11	8.32	0.75	0.40	4.20	0.00	0.30	0.03	0.01	0.15
	Approach	86.7%	5.00	249.0	4.15	2	0.23	4.42	4.93	0.40	4.20	0.01	0.18	0.20	0.02	0.17
	On Runway	63.2%	1.00	148.0	2.47	2	6.21	3.13	28.36	0.40	4.20	0.03	0.02	0.14	0.00	0.02
	Unstick	71.2%	0.25	161.0	2.68	2	3.92	3.26	23.12	0.40	4.20	0.01	0.00	0.03	0.00	0.01
	Taxi In/Idle	63.2%	5.00	148.0	2.47	2	6.21	3.13	28.36	0.40	4.20	0.15	0.08	0.70	0.01	0.10
	Shut down	G Idle	1.00	138.0	2.30	2	8.98	3.05	29.78	0.40	4.20	0.04	0.01	0.14	0.00	0.02
	T&G Level	varies	4.00	varies	varies	2	varies	varies	varies	0.40	4.20	0.01	0.39	0.09	0.04	0.39
	GCA Box	varies	8.00	varies	varies	2	varies	varies	varies	0.40	4.20	0.01	0.56	0.15	0.04	0.39
											Touch and Go	**0.02**	**0.87**	**0.32**	**0.07**	**0.72**
											Full LTO	**0.82**	**0.93**	**3.35**	**0.08**	**0.84**
											GCA Box	**0.01**	**0.56**	**0.15**	**0.04**	**0.39**
Data source: AESO Memorandum Report 9910 Revision B April 2000 and 9935 Revision A March 2000																
C-9 (JT8D-9) APU: GTCP-85	APU Use	On	1	75	293	366	0.42	5.65	3.20	0.40	0.22	0.154	2.069	1.172	0.147	0.081
	Start/Warm	Idle	2	5	1,049	175	10.00	2.90	34.50	0.40	19.59	1.748	0.507	6.029	0.070	3.424
	Unstick	70% rpm	2	0.25	2,368	20	1.72	5.46	9.36	0.40	16.25	0.034	0.108	0.185	0.008	0.321
	Taxi Out	Idle	2	7	1,049	245	10.00	2.90	34.50	0.40	19.59	2.447	0.710	8.441	0.098	4.793
	Run-up	80% rpm	2	0.5	3,547	59	0.67	7.79	4.90	0.40	14.59	0.040	0.461	0.290	0.024	0.863
	Takeoff	Military	2	1	8,254	275	0.47	17.92	1.24	0.40	11.12	0.129	4.931	0.341	0.110	3.060
	Climbout	90% rpm	2	1.5	5,387	269	0.48	11.59	2.51	0.40	12.87	0.129	3.122	0.676	0.108	3.466
	Approach	80% rpm	2	5	3,547	591	0.67	7.79	4.90	0.40	14.59	0.396	4.606	2.897	0.236	8.626
	On runway	70% rpm	2	1	2,368	79	1.72	5.46	9.36	0.40	16.25	0.136	0.431	0.739	0.032	1.283
	Unstick	70% rpm	2	0.25	2,368	20	1.72	5.46	9.36	0.40	16.25	0.034	0.108	0.185	0.008	0.321
	Taxi in	Idle	2	10	1,049	350	10.00	2.90	34.50	0.40	19.59	3.495	1.014	12.059	0.140	6.847
	APU Use	On	1	20	293	98	0.42	5.65	3.20	0.40	0.22	0.041	0.552	0.313	0.039	0.021
											Full LTO	**8.78**	**18.62**	**33.33**	**1.02**	**33.10**
Data source: AESO Memorandum Report 9926 C-9 LTO and Maintenance Emissions Estimates																

[1] Time in mode (TIM) for level modes were estimated from flight track profiles for EA-6B aircraft, assuming a power setting of 37% shp..
[2] FCLP Emission Factors are the same as T&G
[3] Emission rates for T&G and GCA Box operations include approach, climbout, and level modes onlv.

Key:
VOC = volatile organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
SO2 = sulfur dioxide
PM10 = particulate matter
LTO = Landing and Take Off Cycle
T&G = touch and go

TABLE B.4 PROJECTED EMISSIONS FROM IN-FRAME MAINTENANCE RUN UP OPERATIONS OF EA-18G AIRCRAFT

Maintenance Operation and Engine Mode		Engine Power Setting[1]	Maint. Test per yr[1]	No. of Engines in Use[1]	Time-in-Mode per Engine[1] (min)	Fuel Flow Rate per Engine2,3 (lb/hr)	Fuel Used[4] (lbs/AC/yr)	Engine(s): F414-GE-400 (2) Emission Indexes[2,3] (pounds per 1,000 pounds fuel)					APU Type: GTC 36-200 Emissions from Maint. Test per Year[5] (lb /yr)				
								EI CO	EI NO_x	EI HC	EI SO_2	EI PM_{10}	CO	NO_x	HC	SO_2	PM_{10}
APU Check																	
	APU Use	On	52	1	10	197	1,707	2.00	6.25	0.25	0.40	0.22	3.4	10.7	0.4	0.7	0.4
						APU Check Totals	1,707						3.4	10.7	0.4	0.7	0.4
Water Wash																	
	APU Use	On	57	1	5	197	936	2.00	6.25	0.25	0.40	0.22	1.9	5.8	0.2	0.4	0.2
	Main eng run	Gr Idle	57	1	10	723	6,869	93.26	3.29	54.20	0.40	12.75	640.6	22.6	372.3	2.7	87.6
						Water Wash Totals	7,804						642.4	28.4	372.5	3.1	87.8
Low Power- 2 Engines																	
	APU Use	On	701	1	5	197	11,508	2.00	6.25	0.25	0.40	0.22	23.0	71.9	2.9	4.6	2.5
	Main eng run	Gr Idle (56%)	701	2	15	723	253,412	93.26	3.29	54.20	0.40	12.75	23,633.2	833.7	13,734.9	101.4	3,231.0
		80%	701	2	15	2,337	819,287	5.34	7.08	0.34	0.40	8.47	4,375.0	5,800.6	278.6	327.7	6,939.4
						Low Power- Two Engine Totals	1,084,206						28,031.2	6,706.2	14,016.3	433.7	10,172.9
High Power																	
	APU Use	On	34	1	5	197	558	2.00	6.25	0.25	0.40	0.22	1.1	3.5	0.1	0.2	0.1
	Main eng run	Gr. Idle	34	2	10	723	8,194	93.26	3.29	54.20	0.40	12.75	764.2	27.0	444.1	3.3	104.5
	Main eng run	80%	34	2	10	2,337	26,491	5.34	7.08	0.34	0.40	8.47	141.5	187.6	9.0	10.6	224.4
	Main eng run	90%	34	2	10	6,505	73,724	0.70	18.82	0.12	0.40	4.48	51.6	1,387.5	8.8	29.5	330.3
	Main eng run	MIL 96%	34	2	10	9,941	112,666	0.69	30.81	0.12	0.40	2.86	77.7	3,471.2	13.5	45.1	322.2
	Main eng run	AB 97%	34	2	3	35,763	121,594	274.97	9.67	4.87	0.40	0.00	33,434.8	1,175.8	592.2	48.6	-
						High Power Totals	343,228						34,470.9	6,252.6	1,067.8	137.3	981.5
							Total Annual Maintenance Test Emissions From F/A-18G Aircraft (pounds)						**63,147.9**	**12,997.9**	**15,457.1**	**574.8**	**11,242.5**
							Total Annual Maintenance Test Emissions From F/A-18G Aircraft (Tons)						**31.57**	**6.50**	**7.73**	**0.29**	**5.62**

Notes:

[1] Total maintenance tests from Wyle Laboratories, 2004 (see table A.3).

[2] Fuel flow and emission indexes from AESO memorandum report 9725B (Nov 2002).

[3] Fuel used = fuel flow x time-in-mode / 60/ x no. of engines in use x maintenance tests per aircraft year.

[4] Emissions = fuel used / 1000 x emission index

TABLE B.5 EXISTING EMISSIONS FROM IN-FRAME MAINTENANCE RUN UP OPERATIONS OF EA-6B AIRCRAFT

Maintenance Operation and Engine Mode		Engine Power Setting1	Maint. Test per yr[1]	No. of Engines in Use[1]	Time-in-Mode per Engine[1] (min)	Fuel Flow Rate per Engine[2] (lb/hr)	Fuel Used[3] (lbs/yr)	Engine(s): J52-P- 408A (2) Emission Indexes[2] (pounds per 1,000 pounds fuel)					APU Type: None Emissions from Maint. Test per Year[4] (lb/yr)				
								EI CO	EI NOx	EI HC	EI SO2	EI PM10	CO	NOx	HC	SO2	PM10
Water Wash- see Low Power- 2 Engines																	
Low Power- 1 Engine																	
	Main eng run	Idle	2592	1	15	779.0	504,792	55.96	2.38	28.33	0.40	19.94	28248.16	1201.40	14300.76	201.92	10065.55
	Main eng run	75% N2	2592	1	5	2,415.0	521,640	12.11	4.91	1.53	0.40	13.77	6317.06	2561.25	798.11	208.66	7182.98
						Low Power- One Engine Totals	1,026,432						34,565.22	3,762.66	15,098.87	410.57	17,248.54
Low Power- 2 Engines																	
	Main eng run	Idle	1080	2	25	779.0	701,100	55.96	2.38	28.33	0.40	19.94	39233.56	1668.62	19862.16	280.44	13979.93
	Main eng run	75% N2	1080	2	8	2,415.0	695,520	12.11	4.91	1.53	0.40	13.77	8422.75	3415.00	1064.15	278.21	9577.31
						Low Power- Two Engine Totals	1,396,620						47,656.30	5,083.62	20,926.31	558.65	23,557.24
High Power																	
	engine start/taxi	Idle	360	2	16	779.0	149,568	55.96	2.38	28.33	0.40	19.94	8369.83	355.97	4237.26	59.83	2982.39
	Intermed power	70% N2	360	2	15	1,825.0	328,500	18.09	4.30	2.40	0.40	15.41	5942.57	1412.55	788.40	131.40	5062.19
	High power	98% N2	360	2	10	8,755.0	1,050,600	1.58	11.44	0.56	0.40	6.20	1659.95	12018.86	588.34	420.24	6513.72
						High Power Totals	1,528,668						15,972.34	13,787.39	5,614.00	611.47	14,558.29
Total Annual Emissions from EA-6B In Frame Maintenance Testing (lbs)							**3,951,720**						**98,193.86**	**22,633.66**	**41,639.17**	**1,580.69**	**55,364.07**
Total Annual Emissions from EA-6B In Frame Maintenance Testing (tons)							**1,976**						**49.10**	**11.32**	**20.82**	**0.79**	**27.68**

EA-6B Notes:

[1] Total maintenance tests from Wyle Laboratories, 2004 (see table A.3).

[2] No data available for the J52-P-408A engine. Fuel flow and emission indexes are for the J52-P-408 from: *J52-P-408 Engine Fuel Flow and Emission Indexes by Percentage of Core RPM (%N2)* –DRAFT-; Aircraft Environmental Support Office; San Diego, CA., January 1999; AESO Memorandum Report

[3] Fuel used = fuel flow x time-in-mode / 60 x no. of engines in use x maint. test per AC per yr.

[4] Emissions = fuel used / 1,000 x emission index

TABLE B.6 ESTIMATED EMISSIONS FROM IN-FRAME MAINTENANCE RUN UP OPERATIONS OF P-3 AIRCRAFT

Maintenance Operation and Engine Mode		Engine Power Setting[1]	Maint. Test per yr[1]	No. of Engines in Use[1]	Mode per Time-in-Engine[1] (min)	Fuel Flow Rate per Engine[2,3] (lb/hr)	Fuel Used[4] (lbs/yr)	Engine(s): T56-A-14 (4) Emission Indexes[2,3] (pounds per 1,000 pounds fuel)					APU Type: GTCP 95-2/3 Emissions from Maint. Test per Year[5] (lb /yr)				
								EI CO	EI NO_x	EI HC	EI SO_2	EI PM_{10}	CO	NO_x	HC	SO_2	PM_{10}
APU Check																	
	APU Use	On	210	1	30	293	30,765	3.2	5.65	0.42	0.40	0.22	98.45	173.82	12.92	12.31	6.77
						APU Check Totals	30,765						98.45	173.82	12.92	12.31	6.77
Low Power																	
	APU Use	On	520	1	40	293	101,573	3.2	5.65	0.42	0.40	0.22	325.03	573.89	42.66	40.63	22.35
	Main eng run	1000	520	1	15	1000	130,000	2.65	7.61	0.61	0.40	3.97	344.50	989.30	79.30	52.00	516.10
						Low Power Totals	231,573						669.53	1,563.19	121.96	92.63	538.45
Prop Dynamic Balancing																	
	APU Use	On	80	1	40	293	15,627	3.2	5.65	0.42	0.40	0.22	50.01	88.29	6.56	6.25	3.44
	Main eng run	1500	80	1	15	458	9,160	17.40	1.69	90.98	0.40	3.26	159.38	15.48	833.38	3.66	29.86
						Prop Dynamic Totals	24,787						209.39	103.77	839.94	9.91	33.30
Out of Phase Turn																	
	APU Use	On	42	1	40	293	8,204	3.2	5.65	0.42	0.40	0.22	26.25	46.35	3.45	3.28	1.80
	Main eng run	250 (Low Idle)	42	4	30	599	50,316	30.11	3.53	22.32	0.40	3.97	1,515.01	177.62	1,123.05	20.13	199.75
	Main eng run	450 (Normal Idle)	42	4	10	756	21,168	5.65	6.35	1.42	0.40	3.97	119.60	134.42	30.06	8.47	84.04
	Main eng run	1000	42	4	10	1000	28,000	2.65	7.61	0.61	0.40	3.97	74.20	213.08	17.08	11.20	111.16
						Low Power- Two Engine Totals	107,688						1,735.07	571.46	1,173.64	43.08	396.76
High Power																	
	APU Use	On	100	1	40	293	19,533	2	6.25	0.42	0.40	0.22	39.07	122.08	8.20	7.81	4.30
	Main eng run	1500	100	2	10	1200	40,000	1.82	8.43	0.41	0.40	3.97	72.80	337.20	16.40	16.00	158.80
	Main eng run	2750	100	2	10	1800.0	60,000	0.94	9.83	0.21	0.40	3.97	56.40	589.80	12.60	24.00	238.20
	Main eng run	4300	100	2	10	2219.0	73,967	0.65	10.45	0.16	0.40	3.97	48.08	772.95	11.83	29.59	293.65
	Idling engines	250 (Low Idle)	100	2	30	599	59,900	30.11	3.53	22.32	0.40	3.97	1,803.59	211.45	1,336.97	23.96	237.80
						High Power Totals	253,400						2,019.93	2,033.48	1,386.01	101.36	694.95
							Total Annual Maintenance Test Emissions From P-3 Aircraft						**4,732**	**4,446**	**3,534**	**259**	**1,670**
							Total Annual Maintenance Test Emissions From P-3 Aircraft (Tons)						**2.37**	**2.22**	**1.77**	**0.13**	**0.84**

Notes:

[1] Total maintenance tests from Wyle Laboratories, 2004 (see table A.3).

[2] Main engine fuel flow and emission indexes from AESO memo reports 9911 Rev B (Apr 2000) and 9908 Rev B (Mar 2000). APU fuel flow and emission indexes from AESO memo report 9911 Rev B (Apr 2000).

[3] Fuel used = fuel flow x time-in-mode / 60/ x no. of engines in use x maintenance tests per aircraft year.

[4] Emissions = fuel used / 1000 x emission index.

TABLE B.7 SUMMARY OF EXISTING MOBILE AIR EMISSIONS

	# Aircraft	Operation	# Operations (from Table A.1)	LBS Emissions per operation CO	NOx	VOC	SO2	PM10	(TPY) CO	NOx	VOCs	SO2	PM10
EA-6B	72	LTOs, w/ Straight In Arrival	2,820										
		LTOs, w/Break at Arrival	1,996										
		EA-6B LTO, straight in, w/ hot refuel	1,128	65.04	11.66	31.12	0.90	32.57	36.68	6.57	17.55	0.51	18.37
See table B.5 for emission factors		EA-6B LTO, straight in, no hot refuel	1,692	50.51	11.04	23.77	0.79	27.39	42.73	9.34	20.11	0.67	23.17
		EA-6B LTO, break, w/hot refuel	798	64.87	11.56	31.19	0.87	31.57	25.90	4.61	12.45	0.35	12.60
		EA-6B LTO, break, no hot refuel	1,198	50.34	10.94	23.83	0.77	26.39	30.15	6.55	14.27	0.46	15.80
		Total FCLPs	15,316	2.95	4.65	0.50	0.24	5.83	22.60	35.61	3.82	1.84	44.64
		GCA Box	4,119	6.24	7.43	0.97	0.42	11.18	12.84	15.30	1.99	0.87	23.02
		T&G	4,797	2.95	4.65	0.50	0.24	5.83	7.08	11.15	1.20	0.58	13.98
See table B.8 for Maint. Testing emission factors													
See table B.8 for Maint. Testing emission factors	72	Maintenance Testing							49.10	11.32	20.82	0.79	27.68

LTO emission factors from AESO Memorandum Report No. 9917, Revision B, May 2000
FCLP, T&G and GCA Box emission factors from AESO Memorandum Report No. 9941A, August 2002
FCLP totals include Whidbey and Couplville totals.
For FCLP and T&G operations, each cycle (departure and arrival) is counted as one operation. Therefore, totals will be one half totals from table A.1

Assumptions:
Hot refuel occurs for 40% of LTOs (LCDR Gamburg, NAS Whidbey, Feb 2004)
Depart-Re-enter operations are counted as GCA Box Operations for air emission estimating purposes

								TOTAL EA-6B EMISSIONS	**227.07**	**100.45**	**92.20**	**6.07**	**179.28**
	# Aircraft	Operation	# Operations (from Table A.1)	LBS Emissions per operation CO	NOx	VOC	SO2	PM10	(TPY) CO	NOx	VOCs	SO2	PM10
P-3		Average LTO	8,183	37.50	21.21	24.59	1.34	10.79	153.44	86.77	100.60	5.47	44.13
		FCLPs	0	0.69	1.75	0.47	0.47	1.04	0.00	0.00	0.00	0.00	0.00
See Table for LTO emission factors		GCA Box	4,836	1.13	3.78	0.57	0.56	1.99	2.74	9.13	1.37	1.36	4.82
		T&G	6,556	0.69	1.75	0.47	0.47	1.04	2.28	5.74	1.54	1.53	3.40
See Table for maintenance testing emission factors				LBS Emission per aircraft, per year					TPY				
		Maintenance Testing		0.00	0.00	0.00	0.00	0.00	2.37	2.22	1.77	0.13	0.84

data source:
LTO emission factors from AESO Memorandum Report
FCLP, T&G and GCA Box emission factors from AESO Memorandum Report

Assumptions:
Hot refuel occurs for 0% of LTOs
This A/C does not do Break arrivals.

								TOTAL P-3 EMISSIONS	**160.82**	**103.86**	**105.28**	**8.49**	**53.18**
	# Aircraft	Operation	# Operations (from Table A.1)	LBS Emissions per operation CO	NOx	VOC	SO2	PM10	(TPY) CO	NOx	VOCs	SO2	PM10
C-9		Average LTO	325	33.33	18.62	8.78	1.02	33.10	5.41	3.02	1.42	0.17	5.37
See Table B.6 for LTO emission factors													
								TOTAL C-9 EMISSIONS	**5.41**	**3.02**	**1.42**	**0.17**	**5.37**
C-12		Average LTO	100	3.35	0.93	0.82	0.08	0.84	0.17	0.05	0.04	0.00	0.04
See Table B.6 for LTO emission factors													
								TOTAL C-12 EMISSIONS	**0.17**	**0.05**	**0.04**	**0.00**	**0.04**
Transient (P-3)		Average LTO	252	37.50	21.21	24.59	1.34	10.79	4.73	2.67	3.10	0.17	1.36
See Table B.6 for LTO emission factors													
								TOTAL C-12 EMISSIONS	**4.73**	**2.67**	**3.10**	**0.17**	**1.36**
								TOTAL EXISTING AIRCRAFT MOBILE EMISSIONS	**398.18**	**210.05**	**202.04**	**14.89**	**239.23**

TABLE B.8 SUMMARY OF PROJECTED MOBILE AIR EMISSIONS

EA -18G Operations: Projected Emissions													
			# Operations	LBS Emissions per operation					(TPY)				
	# Aircraft	Operation	(from Table A.2)	CO	NOx	VOC	SO2	PM10	CO	NOx	VOCs	SO2	PM10
EA-18G	57	LTOs, w/ Straight In Arrival	2,687										
		LTOs, w/Break at Arrival	1,901										
		LTO w/Straight In, w/ hot refuel, w/AB	860	264.34	23.04	66.14	0.98	18.35	113.65	9.90	28.43	0.42	7.89
		LTO w/Straight In, w/o hot refuel, w/ AB	1290	230.63	21.87	44.67	0.84	13.51	148.73	14.10	28.80	0.54	8.71
		LTO w/Straight In, w/ hot refuel, w/o AB	215	100.55	21.60	63.25	0.80	18.83	10.81	2.32	6.80	0.09	2.02
See table 4 for LTO emission factors		LTO w/Straight In, w/o hot refuel, w/o AB	322	66.84	20.43	41.78	0.66	13.99	10.78	3.29	6.74	0.11	2.26
		LTO w/Break, w/ hot refuel, w/AB	608	265.78	23.31	66.66	0.96	17.94	80.84	7.09	20.27	0.29	5.46
		LTO w/Break, w/o hot refuel, w/ AB	912	232.07	22.14	45.19	0.81	13.10	105.88	10.10	20.62	0.37	5.98
		LTO w/Break, w/ hot refuel, w/o AB	152	101.99	21.87	63.77	0.78	18.42	7.76	1.66	4.85	0.06	1.40
		LTO w/Break, w/o hot refuel, w/o AB	228	68.28	20.70	42.30	0.64	13.58	7.79	2.36	4.83	0.07	1.55
		FCLPs	12,201	0.47	9.01	0.07	0.22	3.04	2.85	54.97	0.41	1.36	18.53
		GCA Box	3,924	0.93	18.02	0.13	0.45	6.08	1.83	35.36	0.26	0.88	11.92
See table 6 for Maint. Testing emission factors		T&G	4,570	0.47	9.01	0.07	0.22	3.04	1.07	20.59	0.15	0.51	6.94
		Maintenance Testing							31.57	6.50	7.73	0.29	5.62
								TOTAL MOBILE EMISSIONS	**523.54**	**168.25**	**129.89**	**4.99**	**78.28**

data source:
LTO emission factors from AESO Memorandum Report No. 9815, Revision E, Nov 2002 (see table B.1)
FCLP, T&G and GCA Box emissions factors from AESO Memorandum Report No. 9933B, Dec 2001
FCLP totals include Whidbey and Couplville totals.
For FCLP and T&G operations, each cycle (departure and arrival) is counted as one operation. Therefore, totals will be one half totals from table A.2

Assumptions:
41% Percentage of Break arrivals (Wyle, Oct 2004 see table A-2)
40% Percentage of LTO's with Hot Refuel (LCDR Gamburg, NAS Whidbey, Feb 2004)
80% Percentage of A/B usage for Takeoffs (Wyle, Oct 2004, Table 4-2)

								TOTAL PROJECTED EA-18G EMISSIONS	**523.54**	**168.25**	**129.89**	**4.99**	**78.28**

			# Operations	LBS Emissions per operation					(TPY)				
	# Aircraft	Operation	(from Table A.2)	CO	NOx	VOC	SO2	PM10	CO	NOx	VOCs	SO2	PM10
P-3	42	Average LTO	8,183	37.50	21.21	24.59	1.34	10.79	153.44	86.77	100.60	5.47	44.13
		FCLPs	0	0.69	1.75	0.47	0.47	1.04	0.00	0.00	0.00	0.00	0.00
See Table for LTO		GCA Box	4,836	1.13	3.78	0.57	0.56	1.99	2.74	9.13	1.37	1.36	4.82
emission factors		T&G	6,556	0.69	1.75	0.47	0.47	1.04	2.28	5.74	1.54	1.53	3.40
See Table for maintenance testing emission factors		Maintenance Testing							2.37	2.22	1.77	0.13	0.84
								TOTAL MOBILE P-3 EMISSIONS	**160.82**	**103.86**	**105.28**	**8.49**	**53.18**

data source:
LTO emission factors from AESO Memorandum Report
FCLP, T&G and GCA Box emission factors from AESO Memorandum Report

Assumptions:
Hot refuel occurs for 40% LTOs

								TOTAL P-3 EMISSIONS	**160.82**	**103.86**	**105.28**	**8.49**	**53.18**

			# Operations	LBS Emissions per operation					(TPY)				
	# Aircraft	Operation	(from Table A.2)	CO	NOx	VOC	SO2	PM10	CO	NOx	VOCs	SO2	PM10
C-9	4	Average LTO	325	33.33	18.62	8.78	1.02	33.10	5.41	3.02	1.42	0.17	5.37
See Table for LTO emission factors													
data source:													
LTO emission factors from AESO Memorandum Report													
								TOTAL C-9 EMISSIONS	**5.41**	**3.02**	**1.42**	**0.17**	**5.37**

			# Operations	LBS Emissions per operation					(TPY)				
	# Aircraft	Operation	(from Table A.2)	CO	NOx	VOC	SO2	PM10	CO	NOx	VOCs	SO2	PM10
C-12	2	Average LTO	0	3.35	0.93	0.82	0.08	0.84	0.00	0.00	0.00	0.00	0.00
See Table for LTO emission factors													
data source:													
LTO emission factors from AESO Memorandum Report													
								TOTAL C-12 EMISSIONS	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

			# Operations	LBS Emissions per operation					(TPY)				
	# Aircraft	Operation	(from Table A.2)	CO	NOx	VOC	SO2	PM10	CO	NOx	VOCs	SO2	PM10
Transient (P-3)		Average LTO	252	37.50	21.21	24.59	1.34	10.79	4.73	2.67	3.10	0.17	1.36
See Table for LTO emission factors													
data source:													
LTO emission factors from AESO Memorandum Report													
								TOTAL TRANSIENT EMISSIONS	**4.73**	**2.67**	**3.10**	**0.17**	**1.36**
								TOTAL PROJECTED AIRCRAFT MOBILE EMISSIONS	**694.49**	**277.81**	**239.69**	**13.81**	**138.19**
								PROJECTED CHANGE TO AIRCRAFT MOBILE EMISSIONS	296.30	67.76	37.65	-1.08	-101.04

Table B.9 EMISSION FACTORS FOR PRIVATELY OWNED VEHICLES, NAS WHIDBEY ISLAND

Fleet Year	Type of Vehicle	EPA Category	Emission Factor (g/mile) NOx	CO	PM	SO2	VOC
2004	Cars	LDGV	1.051	18.998	0.0263	0.0275	1.277
	Pickups under 6000 lbs	LDGT1,2	1.409	23.777	0.0275	0.0351	1.524
	Trucks under 8500 lbs, over 6000 lbs	LDGT3,4	2.02	31.75	0.0291	0.0459	2.505

Source: Mobile 6.2, Using default parameters for Whidbey Island, WA

Table B.10 Residential Distribution of NAS Whidbey Island Personnel

CITY	ZIP	Distance from base (miles)	% of base population	Distance x Percentage
ANACORTES	98221	15.66	4.80%	0.75
BURLINGTON	98233	27.87	1.60%	0.45
CLINTON	98236	40.37	0.40%	0.16
COUPEVILLE	98239	15.25	3.70%	0.56
FREELAND	98249	30.52	0.30%	0.09
GREENBANK	98253	24.98	0.30%	0.07
LA CONNER	98257	19.25	0.20%	0.04
LANGLEY	98260	37.11	0.20%	0.07
MOUNT VERNON	98273	23.7	0.00%	0.00
MOUNT VERNON	98274	32.41	3.20%	1.04
OAK HARBOR	98277	3.73	81.60%	3.04
OAK HARBOR	98278	0	0.00%	0.00
CAMANO IS	98282	48.3	2.30%	1.11
SEDRO-WOOLLEY	98284	32.21	1.40%	0.45
CAMANO IS/STANWOOD	98292	45.4	0.00%	0.00
	Average	26.45	Weighted Ave	7.85

Table B.11 PROJECTED CRITERIA AIR POLLUTANT EMISSIONS FROM PRIVATELY OWNED VEHICLES, NAS WHIDBEY ISLAND

Group	Vehicle Type	EPA Category	Daily Vehicles (/day)	Daily Travel - Per Vehicle			Travel Days (days/yr)	Annual Travel (VMT/yr)	Annual Emissions (lb/yr)				
				On-Base (VMT)	Off-Base (VMT)	Total (VMT)			NOx	VOC	CO	SO2	PM
Existing POV Commute Emissions	Cars (60%)	LDGV	6,627	3	7.85	10.84519	247	17752155.3	41132.1	49976.9	743508.5	1076.2	1029.3
	Pickups under 6000 lbs (30%)	LDGT1,2	3314	3	7.85	10.84519	247	8876077.7	20566.0	24988.4	371754.2	538.1	514.6
	Trucks under 8500 lbs, over 6000 lbs	LDGT3,4	1104.5	3	7.85	10.84519	247	2958692.6	6855.3	8329.5	123918.1	179.4	171.5
	Total	-	**11,045**	-	-	-	-	-	**68553.5**	**83294.8**	**1239180.8**	**1793.7**	**1715.5**
								total tons emissions	**34.3**	**41.6**	**619.6**	**0.9**	**0.9**
Projected POV Commute Emissions	Cars	LDGV	5,963	3	7.85	10.84519	247	15974528.9	37013.3	44972.4	669056.7	968.5	926.2
	Pickups/Light Trucks	LDGT	2982	3	7.85	10.84519	247	7987264.4	18506.6	22486.2	334528.3	484.2	463.1
	Pickups/Light Trucks	LDDT	993.9	3	7.85	10.84519	247	2662421.5	6168.9	7495.4	111509.4	161.4	154.4
	Total	-	**9,939**	-	-	-	-	-	**61688.8**	**74954.0**	**1115094.4**	**1614.1**	**1543.7**
								total tons emissions	**30.8**	**37.5**	**557.5**	**0.8**	**0.8**
								Change in emissions	**-3.4**	**-4.2**	**-62.0**	**-0.1**	**-0.1**

Refer to section 3.3.1 for description and explanation of population data.

Table B.12 Annual Emissions from Ground Support Equipment Operations, 2003-2013

	Operation (hours/yr) 2003 Baseline	Emission Rate					Total Emissions: (TPY)				
		VOC lb/hr	NOX lb/hr	CO lb/hr	SO2 lb/hr	PM-10 lb/hr	VOC TPY	NOX TPY	CO TPY	SO2 TPY	PM-10 TPY
2003 Landing/TakeOff Flight Operations:	13675										
Tow Tractors: (a)											
A/S32A-30A (Small tow)	31092	0.03	0.26	0.10		0.04	0.39	4.04	1.55	0.00	0.68
Flight Line Electric Power Units (a)											
NC8A	2240	0.75	3.83	0.46		0.39	0.84	4.29	0.52	0.00	0.44
NC10C	6606	0.38	3.22	0.34		0.16	1.26	10.64	1.12	0.00	0.53
Jet Engine Start Units (a)											
A/M47A-4/NCPP-105 (b)	7005	5.13	1.14	10.80		1.51	17.97	3.99	37.83	0.00	5.29
GTC-85	1704	0.09	0.70	3.20		0.22	0.08	0.60	2.73	0.00	0.19
Miscellaneous: (a), (c)											
A/S48M-2 Manlift	4208	0.53	0.64	0.86		0.03	1.12	1.35	1.81	0.00	0.06
A/M32C-17 (mobile ac)	6268	0.29	5.02	0.33		0.09	0.91	15.73	1.03	0.00	0.29
A/M27T-5 (hydraulic unit)	6774	0.31	1.95	0.25		0.06	1.05	6.60	0.85	0.00	0.19
A/M42M-2 (floodlight cart)	3955	0.11	0.23	0.19		0.01	0.22	0.45	0.38	0.00	0.01
HLU-196 (bomb lift)	2690	0.11	0.23	0.19		0.01	0.15	0.31	0.26	0.00	0.01
Misc Carts (water, lav, B%B)	2308	0.38	3.22	0.34		0.16	0.44	3.72	0.39	0.00	0.18
(using small power plant EFs)											
Total	**74850.00**						**24.41**	**51.72**	**48.46**	**0.00**	**7.87**
2013 Landing/Take Off Flight Operations:	13348										
Tow Tractors: (a)											
A/S32A-30A (Small tow)	30347	0.03	0.26	0.10		0.04	0.38	3.95	1.52	0.00	0.67
Flight Line Electric Power Units (a)											
NC8A	2186	0.75	3.83	0.46		0.39	0.82	4.19	0.50	0.00	0.43
NC10C	6448	0.38	3.22	0.34		0.16	1.23	10.38	1.10	0.00	0.52
Jet Engine Start Units (a)											
A/M47A-4/NCPP-105 (b)	6837	5.13	1.14	10.80		1.51	17.54	3.90	36.92	0.00	5.16
GTC-85	1663	0.09	0.70	3.20		0.22	0.07	0.58	2.66	0.00	0.18
Miscellaneous: (a), (c)											
A/M32C-17 (mobile ac)	6118	0.29	5.02	0.33		0.09	0.89	15.36	1.01	0.00	0.28
A/M27T-5 (hydraulic unit)	6612	0.31	1.95	0.25		0.06	1.02	6.45	0.83	0.00	0.18
A/M42M-2 (floodlight cart)	3860	0.11	0.23	0.19		0.01	0.21	0.44	0.37	0.00	0.01
HLU-196 (bomb lift)	2626	0.11	0.23	0.19		0.01	0.14	0.30	0.25	0.00	0.01
Misc Carts (water, lav, B%B)	2253	0.11	0.23	0.19		0.01	0.12	0.26	0.21	0.00	0.01
(using small power plant EFs)											
Total							**22.43**	**45.80**	**45.36**	**0.00**	**7.46**
						Change in emissions	**-1.98**	**-5.92**	**-3.10**	**0.00**	**-0.41**

Notes:

(a) Emission Factors from Final Report for Emission Testing on Ground Support Equipment at Naval Air Stations, February 2000, Navy, Atlantic Division.

(b) Emission factor for GTCP100 used.

(c) A/M32C-17 assumed equivalent to "mobile AC"; A/M27T-5 assumed equivalent to "hydraulic test unit"; A/M42M-2 assumed equivalent to "floodlight"; HLU-196 assumed equivalent to size of floodlight cart.

SO2 emission factors are not available

TABLE B.13: PROJECTED EMISSIONS RATES FROM AIRCRAFT ENGINE TEST CELL OPERATIONS (EA-18G), (SINGLE ENGINE IN TEST CELLS)

Engine (Aircraft) F414-GE-400	Power Setting(1),(2)	Time in Power Setting (2) (minutes)	Fuel Flow (lb/hr/eng)	Fuel Flow (lb/min/eng)	Fuel Usage (3) (lbs/test/eng)	Emission Index (3) lb /1000 lb fuel					Engine Test Emissions (pounds)				
						VOC (4)	NOx	CO	SO2	PM10	VOC (5)	NOx	CO	SO2	PM10
Warm Up	Flt idle	25	862.00	14.37	359.17	36.63	3.55	72.17	0.4	12.17	13.16	1.28	25.92	0.14	4.37
Step 1	81.3	5	3603.00	60.05	300.25	0.12	10.53	1.09	0.4	6.19	0.04	3.16	0.33	0.12	1.86
Step 2	88.4	5	6809.00	113.48	567.42	0.12	20.62	0.69	0.4	3.48	0.07	11.70	0.39	0.23	1.97
Step 3	91.3	5	8468.00	141.13	705.67	0.12	24.52	0.69	0.4	2.85	0.08	17.30	0.49	0.28	2.01
Step 4	93.2	5	9351.00	155.85	779.25	0.12	29.23	0.69	0.4	2.25	0.09	22.78	0.54	0.31	1.75
Step 5	96.5	10.00	11893.00	198.22	1982.17	0.12	34.94	0.69	0.4	1.66	0.24	69.26	1.37	0.79	3.29
Step 6	1.0	7.00	11893.00	198.22	1387.52	0.12	34.94	0.69	0.4	1.66	0.17	48.48	0.96	0.56	2.30
IRP	IRP	10.00	11893.00	198.22	1982.17	0.12	34.94	0.69	0.4	1.66	0.24	69.26	1.37	0.79	3.29
A/B	Max A/B	3.00	39678.00	661.30	1983.90	4.72	9.47	262.12	0.4	No Data	9.36	18.79	520.02	0.79	0.00
Stud Down	Flt idle	10.00	862.00	14.37	143.67	36.63	3.55	72.17	0.4	12.17	5.26	0.51	10.37	0.06	1.75
	Total	**85.00**			**10191.17**	**Pounds Emissions Per Test**					**28.71**	**205.78**	**523.71**	**2.93**	**8.88**
						Tons Emissions per test					**0.01**	**0.10**	**0.26**	**0.00**	**0.00**
						Projected Annual Emissions from 71 tests of EA-18G (tpy)					**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
						6B Emissions					**4.84**	**14.65**	**12.24**	**0.64**	**14.06**

Total EA-18 G tests: 71

Notes:
1. Performance Test Time in Mode, Fuel Flow, and Emissions Indexes Draft AESO Memorandum Report 2000-21 July 2000.
2. Total number of tests from Wyle Laboratories, 2004 (see table A.3)

Key:

A/B =	maximum afterburner
VOC =	volatile organic compounds
NOx =	oxides of nitrogen
CO =	carbon monoxide
SO2 =	sulfur dioxide
PM10 =	particulate matter

TABLE B.14: EXISTING EMISSIONS FOR AIRCRAFT ENGINE TEST CELL OPERATIONS (EA-6B), (SINGLE ENGINE IN TEST CELLS)

Engine (Aircraft)	Power Setting	Time in Power Setting[1] (minutes)	Fuel Flow (lb/hr/eng)	Fuel Flow (lb/min/eng)	Fuel Usage[2] (lbs/test/eng)	% Fuel use in Power Setting[1]	Emission Index[3] lb /1000 lb fuel					Single Engine Test Emissions (lbs emissions per 1000 lbs, based on % fuel use per mode)[1]				
							VOC[4]	NOx	CO	SO2	PM10	VOC[4]	NOx	CO	SO2	PM10
J52-P-408A (EA-6B)	Gr Idle (56%)	25.00	779.00	12.98	324.58	0.08	28.33	2.38	55.96	0.4	19.94	2.39	0.20	4.72	0.03	1.68
	76%	10.00	2554.00	42.57	425.67	0.11	1.42	5.05	11.16	0.4	13.44	0.16	0.56	1.23	0.04	1.49
	90%	10.00	5594.00	93.23	932.33	0.24	0.7	8.18	3.33	0.4	8.83	0.17	1.98	0.81	0.10	2.14
	97%	10.00	8278.00	137.97	1379.67	0.36	0.57	10.95	1.74	0.4	6.53	0.20	3.92	0.62	0.14	2.34
	100%	5.00	9479.00	157.98	789.92	0.21	0.57	12.32	1.47	0.4	5.73	0.12	2.53	0.30	0.08	1.17
	Total	**60.00**			**3852.17**						**Pounds Emissions Per 1000 lbs fuel:**	**3.03**	**9.19**	**7.68**	**0.40**	**8.82**

	Reported Emissions (TPY)				
	VOC[4]	NOx	CO	SO2	PM10
2002 Annual Reported Emissions	**5.32**	**16.12**	**13.47**	**0.70**	**15.47**
2003 Annual Reported Emissions	**4.35**	**13.18**	**11.02**	**0.57**	**12.65**
Average 2002/2003 emissions	**4.84**	**14.65**	**12.24**	**0.64**	**14.06**

Fuel burned at test cell (lbs)[5]	
2002	516000.00
2003	422000.00
lbs fuel per gallon	6.80

Notes:

[1]Power setting, time in power setting, and calculation of emissions per mode using % of fuel use is described in Whidbey Island Air Operating Permit Number 008, issued July 27, 2004.

[2]Assumes a product density of 6.8 lb/gallon for JP-5.

[3]Fuel Flow and Emissions Indexes from AESO memo. 9725A and 2002-05..

[4]Aircraft VOC reported as HC in the form CHy/x

[5]As reported to NWAPA, 2004 Title V emission inventory submission (information from Keith Kuenzi, NAS Whidbey 2004)

Key:

	VOC =	volatile organic compounds
	NOx =	oxides of nitrogen
	CO =	carbon monoxide
	SO2 =	sulfur dioxide
	PM10 =	particulate matter
	A/B =	maximum afterburner
	75% =	75% throttle setting

B2 Construction Emissions

Vehicle Engine Exhaust from Grading and Material Hauling Activities
Emission Factors for Vehicle Engine Exhaust from Construction Activities
Total Daily Vehicle Engine Exhaust Emissions from Construction Activities
Total Vehicle Engine Exhaust Emissions from Construction Activities
Fugitive Emissions from Construction Activities
Equation Used to Calculate Operation Parameters
Equations Used to Calculate Mass/Unit Emission Factors (Corrected for PM_{10})
Emission Factors for Fugitive Emissions from Construction Activities
Calculation of Annual Fugitive Emissions from Construction Activities
Demolition Particulate Emissions

CALCULATION OF CONSTRUCTION EMISSIONS
NAS Whidbey Island

Construction Emissions: Vehicle Engine Exhaust from Grading and Material Hauling Activities

Input Parameters/Assumptions:

Total Building Area:	20,000	ft^2
Total Paved Area:	10,000	ft^2
Total Disturbed Area:	3.00	acres
Construction Duration:	0.25	years
Annual Construction Activity:	250	days/yr
Total Demolition:	10,000	ft^2

Emission Factors for Vehicle Engine Exhaust from Construction Activities

Activity	SMAQMD Emission Factor									
	ROG[1]		NO_x		SO_2 [2]		CO [2]		PM_{10}	
Grading Equipment[3]	2.91E-01	lbs/acre/day	2.75E+00	lbs/acre/day	0.18	lbs/acre/day	0.60	lbs/acre/day	2.32E-01	lbs/acre/day
Material Hauling[4]	4.20E-01	lbs/acre/day	6.07E+00	lbs/acre/day	0.40	lbs/acre/day	1.31	lbs/acre/day	4.30E-01	lbs/acre/day

Reference: *Air Quality Thresholds of Significance* , Sacramento Metropolitan Air Quality Management District (SMAQMD), 1994 and *Compilation of Air Pollutant Emission Factors* (USEPA AP-42).

[1] ROG = VOC.

[2] Factors for grading equipment are calculated from AP-42 for diesel engines using ratios with the NO_x factors.

[3] Grading Activities assumes the use of one tracked loader, one wheeled loader, and one motor grader for each 10 acres of disturbed area, used 8 hours per day.

[4] Material Hauling Activities assumes the use of one loader and one haul truck for each 10 acres of disturbed area, used 8 hours per day.

Total Daily Vehicle Engine Exhaust Emissions from Construction Activities [1]

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	0.9	8.3	0.5	1.8	0.7
Material Hauling	1.3	18.2	1.2	3.9	1.3
Total Emissions (lbs/day):	**2.1**	**26.5**	**1.8**	**5.7**	**2.0**

[1] Total Emissions (lbs/day) = Emission Factor * Affected Acres

Total Vehicle Engine Exhaust Emissions from Construction Activities [1]

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	0.03	0.26	0.02	0.06	0.02
Material Hauling	0.04	0.57	0.04	0.12	0.04
Demolition					0.6
Fugitive Emissions (from page 2)					5.57
Total Emissions(tons/yr)	**0.07**	**0.83**	**0.06**	**0.18**	**5.63**

[1] Total emissions (TPY) = Total emissions (lbs/day) * days of construction / 2000 lbs per ton

Construction Emissions: Fugitive Emissions from Construction Activities

Input Parameters / Assumptions			
Acres affected:	3.0	acres/yr	
Grading days/yr:	30	days/yr	
Exposed days/yr:	90	days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil percent silt, s:	15	%	
Soil percent moisture, M:	2	%	
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	5	ft	
Qty construction vehicles:	3	vehicles	
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)

Reference: *CEQA Air Quality Handbook* , SCAQMD, April 1993.

Equation Used to Calculate Operation Parameters

Operation Parameter	Emission Factor	Equation
Grading duration per acre	80 hr/acre	Grading days * hours per day / acres affected
Bulldozer mileage per acre	1.7 VMT/acre	Miles traveled by bulldozer, based on dozer path width
Construction VMT per day	15 VMT/day	Number of vehicle * VMT per vehicle per day
Construction VMT per acre	150 VMT/acre	Construction VMT * days of construction / acres affected (Travel on unpaved surfaces within site)

Equations Used to Calculate Mass/Unit Emission Factors (Corrected for PM_{10})

Operation	Empirical Equation	Units	AP-42 Section (4th Edition)
Bulldozing	0.75(s^1.5)/(M^1.4)	lbs/hr	8.24, Overburden
Grading	(0.60)(0.051)S^2.0	lbs/VMT	8.24, Overburden
Vehicle Traffic	(3.72/(M^4.3))*0.6	lbs/VMT	8.24, Overburden

Reference: *Compilation of Air Pollutant Emission Factors,* USEPA AP-42;
Section 8.24, Western Surface Coal Mining (4th Edition)

Emission Factors for Fugitive Emissions from Construction Activities[1]

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/acre)
Bulldozing	16.51 lbs/hr	80 hr/acre	1320.8 lbs/acre
Grading	0.77 lbs/VMT	1.7 VMT/acre	1.3 lbs/acre
Vehicle Traffic	0.11 lbs/VMT	150 VMT/acre	16.5 lbs/acre

[1] Emission Factor (lbs/acre) = Emission Factor (lbs per hour or VMT) * Operation Parameter (hours of VMT per acre)

Calculation of Annual Fugitive Emissions from Construction Activities

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing[1]	1320.8 lbs/acre	3.00	NA	3,962	1.98
Grading[1]	1.3 lbs/acre	3.00	NA	4	0.00
Vehicle Traffic[1]	16.5 lbs/acre	3.00	NA	50	0.02
Erosion of Graded Surface[2]	26.4 lbs/acre/day[3]	3.00	90	7,128	3.56
TOTAL				**11,144**	**5.57**

[1] Total annual emissions (TPY) = Emission Factor (lbs/acre) * affected acres * 2000 lbs per ton

[2] Total annual emissions (TPY) from erosion = Emission Factor (lbs/acre) * days of construction * 2000 lbs per ton

[3] Reference: CEQA Air Quality Handbook, SCAQMD, April 1993.

Demolition Particulate Emissions

Calculation of PM Emissions		
Space to be demolished	(SQ FT)	10,000.00
Emission from Structure removal	(LBS)	5.1
Emissions from debris removal	(LBS)	94.0
Emissions from vehicle activity	(LBS)	1064.5
Total PM_{10} emissions	LBS/YR	1163.60
Total PM_{10} emissions	**TPY**	**0.58**

Notes:

(2) PM emission from structure takedown based on sq ft *EF

(3) PM emission from debris removal based on sq ft *EF

(4) PM emission from on-site vehicle activity based on sq ft *EF

(5) Pushing (bulldozing) PM emission put under site prep spreadsheet

(6) Reference EPA-450/2-92-004 (Fugitive Dust document)
(all EF's in EPA document converted to english units)