

General Plan-Based Environmental Impact Analysis Process Environmental Assessment Volume I



Tyndall Air Force Base



**United States Air Force
Air Education and Training Command
325th Fighter Wing
Tyndall Air Force Base, Florida**

September 2009

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14. ABSTRACT

The 325 FW at Tyndall AFB is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current Tyndall AFB General Plan (General Plan). The purpose of the proposed and alternative actions is to construct renovate, demolish, and operate facilities and infrastructure to support current and potential future training levels at Tyndall AFB. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace old, inadequate facilities; correct current deficiencies; and accommodate any potential future mission activities. The proposed and alternative actions provide a range of construction, renovation, and demolition scenarios so that a comparison can be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction and demolition of the installation to a substantially higher level of mission activity. The Proposed Action would construct, renovate, and demolish facilities and infrastructure at Tyndall AFB to improve the effectiveness of training; enhance quality of life; replace old inadequate facilities; and correct current deficiencies. There would be no new missions or personnel assigned to Tyndall AFB as a result of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Tyndall AFB. The Potential Development Alternative (PDA) represents a broader approach to installation and mission development at Tyndall AFB. The PDA would incorporate the construction and demolition activities defined in the Proposed Action, additional programmed projects, as well as broader installation expansion. Under the PDA, approximately 6,442 acres of land would be developed at Tyndall AFB. This would represent development of approximately 75 percent of the developable land on Tyndall AFB. The PDA would also result in an additional 5,184 personnel and their dependents at Tyndall AFB. Under the No-action Alternative, there would be no construction, renovation, or demolition of any infrastructure at Tyndall AFB. The following resources were identified for study in this EA: Airspace Use and Management Noise, Land Use, Air Quality, Earth Resources, Biological Resources, Cultural Resources, Water Resources, Hazardous Materials and Wastes, Safety, Infrastructure and Utilities, Socioeconomic Resources, and Environmental Justice.

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FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT
INSTALLATION DEVELOPMENT ENVIRONMENTAL IMPACT ANALYSIS
PROCESS

TYNDALL AIR FORCE BASE, FLORIDA

AGENCY: 325th Fighter Wing (325 FW), Tyndall Air Force Base (AFB), Florida.

BACKGROUND: The 325 FW at Tyndall AFB has prepared an environmental assessment (EA) based on the installation's General Plan and Capital Improvements Program (CIP) requirements. This EA has been accomplished pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations implementing the NEPA, 40 Code of Federal Regulations (CFR) Sections 1500-1508 *Regulations for Implementing NEPA*, and 32 CFR Part 989 *Environmental Impact Analysis Process*.

PROPOSED ACTION: The Air Force proposes to implement future installation development based upon the CIP contained within the current the *Tyndall AFB General Plan* (General Plan). The Proposed Action will construct approximately 936,525 square feet of new facilities and demolish approximately 545,627 square feet of existing facilities and infrastructure at Tyndall AFB to improve the effectiveness of training; enhance quality of life; replace old inadequate facilities; and correct current deficiencies. There will not be any new missions, new aircraft, or personnel assigned to Tyndall AFB as a result of the Proposed Action.

NO-ACTION ALTERNATIVE: Under the No-action Alternative, the Air Force will not construct or alter any facilities or infrastructure at Tyndall AFB.

POTENTIAL DEVELOPMENT ALTERNATIVE: The Air Force proposes to accommodate the CIP requirements as in the Proposed Action but also to provide for additional installation development beyond those projects specifically identified in the Proposed Action. The Potential Development Alternative (PDA), represents a broader approach to installation and mission development at Tyndall AFB. Under the PDA, Tyndall AFB will be developed to 75 percent of its potential, which is a level substantially higher than the current development. This will equate to the development of approximately 6,442 acres of land on Tyndall AFB resulting in approximately 2.3 million square feet (approximately 113.92 acres) of additional facility space and 983 acres of additional impervious cover on the installation. There will also be an increase in personnel associated with the PDA that will add approximately 5,184 additional personnel and their dependents to the installation. Also under the PDA, aircraft operations would increase by 60 percent to approximately 183,000 annual operations.

SUMMARY OF FINDINGS FOR THE PROPOSED ACTION:

Airspace Use and Management. There will be no change to sortie counts or flight operations; therefore, no impacts to airspace use and management.

Noise. There will be no change to sortie counts or flight operations and no long-term impacts to noise from flying operations. Demolition and construction activities in the vicinity of the project locations will result in short-term intermittent increases in noise levels.

Land Use. No impacts are expected. The activities in the Proposed Action will be compatible with existing land uses and will be in accordance with land use plans for the installation (the General Plan). The proposed projects will not alter existing land use designations. The Proposed Action will not impact adjacent land-use patterns.

Air Quality. There will be no mission change and no long-term impacts in air emissions. There will be a short-term increase in air emissions associated with the construction, renovation, and demolition activities. The increase in emissions will not be expected to cause the region to exceed air quality standards and will fall within the 10 percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants. The Proposed Action will occur in an area that is currently classified as "attainment" for National Ambient Air Quality Standards, it will not be subject to a conformity analysis, and it will not expose the public or operational personnel to hazardous levels of air emissions.

Earth Resources. The soils in the vicinity of the proposed construction projects at Tyndall AFB have been previously disturbed and the projects are located in improved areas with existing facilities and paved roads. There will be short-term soil disturbance as a result of the proposed construction and demolition activities.

Biological Resources. Wildlife occurring in vegetated areas disturbed by construction and demolition activities would be expected to relocate to other suitable habitat. The majority of animal and plant species found on Tyndall AFB are not located in the proposed construction and demolition areas. Noise from construction activities, increased traffic, and earth moving activities could temporarily disturb wildlife near construction areas.

Cultural Resources. There is a low probability of impacts to archaeological resources located within the Cantonment Area expected as part of the Proposed Action. Archaeological resources located in undeveloped areas could be impacted by construction activities. With the exception of 25 Cold-War era historic resources, no historic properties will be impacted by construction or demolition activities. Of these 25 resources, 15 are recommended as ineligible for listing on the National Register of Historic Places (NRHP). The remaining 10 properties, as well as potentially impacted archaeological resources will require survey and evaluation of NRHP-eligibility by a qualified archaeologist and State Historic Preservation Officer concurrence with eligibility determinations.

Water Resources. There will be a potential for short-term increases in the sediment loading of surface water as a result of demolition and construction activities associated

with the Proposed Action. There will be no overall impact to the quality of groundwater at Tyndall AFB or the surrounding area. There will be a potential decrease in groundwater recharge due to the increase in impervious cover. Proposed construction and demolition activities are not located within the delineated 100-year floodplains.

Hazardous Materials and Wastes. There will be no mission change and no long-term impacts to hazardous materials and hazardous waste. Hazardous materials and wastes will be managed in accordance with existing Tyndall AFB, state, and federal plans and regulations; and will be within the capacity of the existing system to manage. Project activities associated with the Proposed Action will occur within one-half mile of known Environmental Restoration Program (ERP) and Military Munitions Response Program (MMRP) sites, but it is unlikely that construction or demolition activities will impact these sites or encounter contaminated groundwater.

Safety. There will be no mission change and no long-term impacts to safety. There will not be any new personnel associated with the Proposed Action; therefore, there will be no change in ground and traffic safety as it relates to privately owned vehicles. There will be a short-term impact to safety due to the temporary increase in construction activities.

Infrastructure and Utilities. There will be a long-term increase in potable water, electrical, and natural gas consumption and wastewater generation under the Proposed Action as part of the construction of new facilities. There will also be a short-term increase in potable water usage from dust suppression activities during construction and demolition. Short-term increases in solid waste generation and traffic on the installation will be realized due to construction and demolition activities. There will be no impacts to utility system capacities.

Socioeconomic Resources. There will be no change to the population, housing, or local school enrollment. There will be a short-term increase in local expenditures as a result of the construction and demolition projects. Given the scope of the proposed changes on Tyndall AFB as well as the proposed timeline for implementation, there will be no impact to the socioeconomics of the community.

Environmental Justice. There are no minority or low-income populations present at Tyndall AFB. Because there are no such populations present on the installation, there is not an environmental justice community present that would be affected by the Proposed Action.

SUMMARY OF FINDINGS FOR NO-ACTION ALTERNATIVE: The conditions and characteristics anticipated under the No-action Alternative for each resource area will continue at levels equal to those occurring under the existing, baseline conditions.

SUMMARY OF FINDINGS FOR THE POTENTIAL DEVELOPMENT ALTERNATIVE:

Airspace Use and Management. There will be no change to classification of Tyndall AFB as Class D Airspace and no restriction of other air traffic in the vicinity of Tyndall

AFB. Also, there will be no need for additional or new controlled airspace, or special use airspace or expansion of existing Military Operations Areas.

Noise. There will be an extension of noise contours along all axes due to the increase in aircraft operations; however, noise level increases will be below perceptible levels. Demolition and construction activities in the vicinity of the project locations will result in short-term intermittent increases in noise levels.

Land Use. No impacts to land use compatibility are expected. The activities in the PDA will be compatible with existing land uses and will be in accordance with land use plans for the installation (the General Plan). The proposed development will alter existing land use designations; however, the reassigned classifications will be compatible with planning goals for the installation. The PDA will not impact adjacent land-use patterns.

Air Quality. There will be a long-term increase in air emissions due to a greater number of privately owned vehicles associated with the personnel increase, as well as a 60 percent increase in aircraft operations. There will be a short-term increase in air emissions associated with the construction, renovation, and demolition activities. The increase in emissions will not be expected to cause the region to exceed air quality standards and will fall within the 10 percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants. The PDA will occur in an area that is currently classified as "attainment" for National Ambient Air Quality Standards, it will not be subject to a conformity analysis, and it will not expose the public or operational personnel to hazardous levels of air emissions.

Earth Resources. There will be short-term soil disturbance as a result of the construction, renovation, and demolition activities associated with the PDA. The soils in the vicinity of the development areas may have not been previously developed. However, no changes to topography, lithology, stratigraphy, geological structures, or the soil composition, structure, or function within the environment will be expected. Therefore, the impacts associated with the PDA will be localized to each construction site and will be controlled using best management practices to reduce soil erosion.

Biological Resources. No adverse impacts to biological resources are expected as a result of the PDA. As part of this alternative, the Air Force will develop approximately 6,442 acres of open area. This development will not occur in wetlands, floodplains, or areas of suitable habitat or known locations of threatened and endangered species. Wildlife present in more intensely-developed land use areas will relocate to other areas on or off of the installation. Noise created during construction and demolition activities will temporarily disturb wildlife near the project areas; however, this disturbance will be expected to be short-term and intermittent.

Cultural Resources. No impacts to archaeological resources located within the Cantonment Area are expected as part of the PDA. Archaeological resources located in undeveloped areas could be impacted by construction activities. With the exception of 35 Cold-War era historic resources, no historic properties will be impacted by construction or demolition activities. Of these 35 resources, 19 are recommended as ineligible for listing

on the National Register of Historic Places (NRHP). The remaining 16 properties, as well as potentially impacted archaeological resources will require survey and evaluation of NRHP-eligibility and State Historic Preservation Officer concurrence with eligibility determinations.

Water Resources. There will be a potential for short-term increases in the sediment loading of surface water as a result of demolition and construction activities associated with the Proposed Action. There will be no overall impact to the quality of groundwater at Tyndall AFB or the surrounding area. There will be a potential decrease in groundwater recharge due to the increase in impervious cover. Construction and demolition activities associated with the PDA are not located within the delineated 100-year floodplains. There will also be an increase in surface water demand as a result of the population increase and subsequent potable water demand.

Hazardous Substances. Hazardous materials and wastes will be managed in accordance with existing Tyndall AFB, state, and federal plans and regulations; and will be within the capacity of the existing system to manage. Project activities associated with the PDA will occur within one-half mile of known Environmental Restoration Program (ERP) and Military Munitions Response Program (MMRP) sites, but it is unlikely that construction or demolition activities will impact these sites or encounter contaminated groundwater. There will be a long-term increase in the hazardous waste stream associated with new aircraft maintenance and industrial facilities.

Safety. There will be a short-term increase in potential for accidents due to change in traffic and use of construction equipment, as well as a long-term increase in the potential for more traffic accidents to occur as a result of the increase in population.

Infrastructure and Utilities. There will be a long-term increase in potable water consumption, electrical and natural gas consumption, solid waste generation, wastewater generation, and traffic under the PDA as part of the construction of new facilities and the addition of personnel. There will also be a short-term increase in potable water usage from dust suppression activities during construction and demolition. Short-term increases in solid waste generation and traffic on the installation will be realized due to construction and demolition activities. There will be no impacts to utility system capacities.

Socioeconomic Resources. There will be an increase of 5,184 personnel and their dependents into the local community as a result of the PDA. There will also be a long-term increase in area school populations. There will be a long-term increase in housing requirements on and off base. Additionally, there will be a short- and long-term impact to the local economy as a result of the construction and demolition projects and the increase in population.

Environmental Justice. There are no minority or low-income populations present at Tyndall AFB. Because there are no such populations present on the installation, there is not an environmental justice community present that would be affected by the Proposed Action.

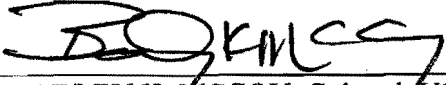
SUMMARY OF CUMULATIVE EFFECTS: Potential cumulative effects would include an increase in soil disturbance associated with construction activities. The impacts would be minimized by the use of best management practices to minimize soil erosion. Projects that would be built concurrently with the alternatives analyzed in the EA would also create an additional 3.4 acres of impervious cover on Tyndall AFB, resulting in additional surface water runoff caused by an increase in impervious surface from installation development. To ensure that the additional overland flow would not impact Tyndall AFB, the base stormwater system must be maintained and potentially expanded to meet the additional capacity. To further minimize the short- and long-term impacts, site specific and base-wide Stormwater Pollution Prevention Plans would be implemented. The additional projects would also increase solid waste generation and would contribute to the temporary short-term increase in traffic resulting from construction, renovation, and demolition activities. This would increase the deterioration of roadways already projected from the Proposed Action and PDA.

SUMMARY OF PUBLIC REVIEW AND INTERAGENCY COORDINATION: The Environmental Assessment and draft Finding of No Significant Impact was available to the public for 30 days at the Bay County Public Library and the Tyndall AFB Public Library. Copies were also sent to a list of interested persons. There were nine unique comments. Four of the comments noted concurrence, noted that no comments would be submitted, or noted no objections. One comment recommended minor text changes related to cultural resources, coordination of NRHP eligibility with the Florida Department of State, and recommendations for treatment of ground disturbing activities. One comment provided guidance related to critical habitat for federally protected species as well as best management practices for reducing impacts to federally protected species. Two comments recommended best management practices for reducing impacts from increased storm water. One comment identified additional permitting requirements, as well as addressed the potential for the anticipated redesignation of Bay County as non-attainment for ozone in March 2010. All comments were addressed within the EA text.

DECISION: Based upon my review of the EA attached and incorporated by reference, I conclude that neither of the alternatives, nor the Proposed Action, will have a significant direct, indirect, or cumulative impact upon the environment. Accordingly, the requirements of the NEPA, regulations promulgated by the President's Council on Environmental Quality, and 32 CFR Part 989 are fulfilled and an Environmental Impact Statement is not required at this time.

While this EA concludes that implementing the preferred alternative or the PDA would not result in significant impacts to the environment, environmental conditions and/or regulations may change in the future. As funding becomes available, each project undertaken pursuant to the preferred alternative or PDA will be reviewed by the 325 CES/CEAN (Natural Resources Management) prior to implementation to ensure it has been sufficiently identified and that there has not been a substantial change in the base mission or project scope, nor significant new circumstances or information relevant to environmental conditions, or changes to environmental regulations warranting reevaluation of potential environmental consequences. Should there be a project not sufficiently identified, or a substantial change in scope, conditions, or regulations, the base will pursue

EIAP using an interdisciplinary approach. The 325 CES/CEAN will document the completion of this review.


BRADLEY K. MCCOY, Colonel USAF
Vice Commander, 325th Fighter Wing

2 NOV 09
Date

Cover Sheet

COVER SHEET

Responsible Agency: 325th Fighter Wing (325 FW), Tyndall Air Force Base (AFB), Florida

Proposed Action: Installation Development at Tyndall AFB, Bay County, Florida

Points of Contact: Tyndall AFB Environmental: Mr. Jose Cintron, 325 CES/CEANC, 119 Alabama Ave, Tyndall AFB, Florida 32403, (850) 283-4341

Report Designation: Environmental Assessment

Abstract: The 325 FW at Tyndall AFB is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current *Tyndall AFB General Plan* (General Plan). The purpose of the proposed and alternative actions is to construct, renovate, demolish, and operate facilities and infrastructure to support current and potential future training levels at Tyndall AFB. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace old, inadequate facilities; correct current deficiencies; and accommodate any potential future mission activities. The proposed and alternative actions provide a range of construction, renovation, and demolition scenarios so that a comparison can be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction and demolition of the installation to a substantially higher level of mission activity.

The Proposed Action would construct, renovate, and demolish facilities and infrastructure at Tyndall AFB to improve the effectiveness of training; enhance quality of life; replace old, inadequate facilities; and correct current deficiencies. There would be no new missions or personnel assigned to Tyndall AFB as a result of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Tyndall AFB. The Potential Development Alternative (PDA) represents a broader approach to installation and mission development at Tyndall AFB. The PDA would incorporate the construction and demolition activities defined in the Proposed Action, additional programmed projects, as well as broader installation expansion. Under the PDA, approximately 6,442 acres of land would be developed at Tyndall AFB. This would represent development of approximately 75 percent of the developable land on Tyndall AFB. The PDA would also result in an additional 5,184 personnel and their dependents at Tyndall AFB. Under the No-action Alternative, there would be no construction, renovation, or demolition of any infrastructure at Tyndall AFB.

The following resources were identified for study in this EA: Airspace Use and Management, Noise, Land Use, Air Quality, Earth Resources, Biological Resources, Cultural Resources, Water Resources, Hazardous Materials and Wastes, Safety, Infrastructure and Utilities, Socioeconomic Resources, and Environmental Justice.

PRIVACY ADVISORY NOTICE

Letters or other written comments provided may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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APPENDICES MAY BE FOUND IN VOLUME II

Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS

%	percent
°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
AAFES	Army and Air Force Exchange Service
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AOC	Area of Concern
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
ATC	Air Traffic Control
AWTP	Advanced Wastewater Treatment Plant
BART	Best Available Retrofit Technology
bgs	below ground surface
BMP	Best Management Practice
C	Consideration encouraged
CAAA	Clean Air Act Amendment
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH	critical habitat designation
CIP	Capital Improvements Program
CO	carbon monoxide
COC	Community of Comparison
CWA	Clean Water Act
dB	decibel
dBA	“A-weighted” decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
E	Endangered
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ERP	Environmental Restoration Program

ACCRONYMS AND ABBREVIATIONS (CONTINUED)

ESA	Endangered Species Act
ETR	Engine Thrust Request
FAA	Federal Aviation Administration
FDEP	Florida Department of Environmental Protection
FICON	Federal Interagency Committee on Noise
FS	Feasibility Study
FW	Fighter Wing
FY	fiscal year
GMI	Geo-Marine, Inc.
gpd	gallons per day
HRMA	Housing Requirements and Market Analysis
HUD	Housing and Urban Development
IFR	instrument flight rules
IICEP	Intergovernmental and Interagency Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
kcf	thousand cubic feet
LBP	lead-based paint
L _{eq}	Equivalent Sound Level
L _{max}	Maximum Sound Level
MACA	Mid-Air Collision Avoidance
MFH	Military Family Housing
MGD	million gallons per day
MILCON	Military Construction Program
MMRP	Military Munitions Response Program
MOA	Military Operations Area
mph	miles per hour
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheets
MSGP	Multi-Sector General Permit
MSL	mean sea level
MWh	Megawatt-hours
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	noise level reduction
NM	nautical mile
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides

ACRONYMS AND ABBREVIATIONS (CONTINUED)

NPDES	National Pollutant Discharge Elimination System
NRCS	US Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	New World Research
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PDA	Potential Development Alternative
PM ₁₀	particulate matter less than 10 micrometers in aerodynamic diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in aerodynamic diameter
POL	petroleum, oil and lubricant
POV	personal operated vehicle
ppm	parts per million
PTA	Prentice Thomas and Associates
RA-O	Remedial Action Objective
RAPCON	Radar Approach Control
R-Areas	Restricted Areas
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD/DD	Record of Decision/Decision Document
ROI	Region of Influence
RPM	revolutions per minute
SAS	Southeastern Archeological Service, Inc.
SEL	Sound Exposure Level
SF	square feet
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SO ₂	sulfur dioxide
SO _x	sulfur oxides
SPL	Sound Pressure Level
SSC	Species of Special Concern
St.	Saint
SUA	Special Use Airspace
SWPPP	Storm Water Pollution Prevention Plan
T	Threatened
T(S/A)	Threatened by similarity of appearance
TECO	Peoples Gas
tpy	tons per year

ACCRONYMS AND ABBREVIATIONS (CONTINUED)

USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VFR	visual flight rules
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	volatile organic compound
W-Area	Warning Area
WRAP	Western Regional Air Partnership
WSEP	Weapons System Evaluation Program
WWII	World War II

Chapter 1

Purpose of and Need for Action

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

This chapter has six parts: a statement of the purpose of and need for action, a description of the location of the proposed and alternative actions, identification of the decision to be made, a description of the scope of the environmental review, identification of applicable regulatory requirements, and an introduction to the organization of the document.

1.1 PURPOSE OF AND NEED FOR ACTION

The 325th Fighter Wing (FW) at Tyndall Air Force Base (AFB), Florida is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current *Tyndall AFB General Plan* (General Plan). Currently, Tyndall AFB conducts training for F-15 *Eagle* and F-22 *Raptor* pilots, air battle managers, air traffic controllers, intelligence personnel specially trained on the F-15, and weapons controllers and crew chiefs specially trained on the F-15 and F-22. The General Plan includes a profile of the installation and vicinity, summary of constraints and opportunities impacting future development potential, current and proposed infrastructure and land use, and the CIP. This Environmental Assessment (EA) will analyze impacts of projects based on the CIP and related mission activities.

The purpose of the proposed and alternative actions is to construct, renovate, and demolish facilities and infrastructure at Tyndall AFB as part of the Installation Development activities outlined in the General Plan. The projects resulting from the CIP provide for critical infrastructure projects required to achieve the goals for installation development in accordance with the Installation General Plan. These goals include:

- Provide maximum operational support and to be prepared to perform missions as assigned;
- Ensure the protection, supply, use, and management of human, financial, environmental, and constructed resources;
- Promote public health, safety, welfare, and overall quality of life;
- Promote compatible land use development near airfields in a manner that will limit restrictions to base operations while protecting adjacent communities;
- Provide an effective, orderly, and obtainable direction for future development;
- Promote an efficient traffic flow pattern between functionally related land uses;
- Enhance the base visual and aesthetic resources; and
- Collocate or consolidate activities that are functionally related in an effort to improve operational efficiency.

The proposed and alternative actions will provide a range of construction, renovation, and demolition scenarios so that a comparison may be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction, renovation, and demolition of the installation to its sustainable capacity.

1.2 LOCATION OF THE PROPOSED ACTION

Tyndall AFB is located in Bay County, 13 miles east of Panama City and eight miles south of Springfield and Callaway, Florida (Figure 1-1). The installation is located on the Florida Panhandle along the Gulf of Mexico. Tyndall AFB consists of 28,460 acres of land of which approximately 9,045 acres are considered developed.



1.3 DECISION TO BE MADE

This analysis evaluates the potential environmental consequences of actions associated with construction, renovation, and demolition of facilities and infrastructure at Tyndall AFB. The construction and demolition projects associated with the Proposed Action would complete the implementation of Tyndall AFB's CIP. Based on this information, the Air Force will determine whether to implement the Proposed Action, take no action ("No-action Alternative"), or implement the Potential Development Alternative (PDA). As required by the National Environmental Policy Act (NEPA) and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project, and must be available to inform decision-makers of the potential environmental impacts of selecting the Proposed Action, No-action Alternative, or the PDA.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

NEPA requires federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) has issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental impact analysis. The Air Force *Environmental Impact Analysis Process* (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508), Department of Defense (DoD) Instruction 4715.9 *Environmental Planning and Analysis*, and 32 CFR 989 (Environmental Impact Analysis Process), 15 July 1999, and amended 1 July 2005. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with construction, renovation, and demolition of facilities and infrastructure at Tyndall AFB, taking into consideration possible cumulative impacts from other actions. The potential environmental effects of taking no action are also described. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Fiscal year (FY) 2007 or the most current information is used as the baseline condition.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on 11 February 1994. In the EO, the President instructed each federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Adverse is defined by the Federal Interagency Working Group on Environmental Justice as "having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms." This EA will determine if the proposed or alternative actions would result in adverse effects to low-income or minority populations.

The Air Force has announced other independent actions for Tyndall AFB concurrent with the proposed or alternative actions. The environmental impacts of these other actions, in most cases, have been analyzed in separate NEPA documents. In addition, other actions are planned for the surrounding community (see Section 2.6). Through Intergovernmental and Interagency Coordination for Environmental Planning (IICEP), requests have been made for information on these and other planned actions in the surrounding community. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

1.4.1 Resource Areas Addressed in Detail

Resource areas that could be affected by the proposed or alternative actions have been selected to allow for a comprehensive analysis of potential impacts. The following resource areas are discussed in detail in the EA:

- Noise
- Land Use
- Air Quality
- Earth Resources
- Biological Resources
- Cultural Resources
- Water Resources
- Airspace Use and Management
- Hazardous Materials and Wastes
- Safety
- Utilities and Infrastructure
- Socioeconomic Resources
- Environmental Justice
- Resource Topics Eliminated from Detailed Analysis

All resources would be affected by the proposed or alternative actions; therefore, no resources have been eliminated from further study in this document.

1.5 APPLICABLE REGULATORY REQUIREMENTS

This EA is part of the EIAP for the proposed project and was prepared in compliance with NEPA regulations. The following paragraphs describe the laws and regulations that apply or may apply to the proposed and alternative actions.

1.5.1 Interagency and Intergovernmental Coordination

Federal, state, and local agencies with jurisdiction that could be affected by the proposed or alternative actions have been notified and consulted. A complete listing of the agencies consulted may be found in Chapter 6 and IICEP correspondence and responses are included in Appendix A. This coordination fulfills the Interagency Coordination Act and EO 12372 *Intergovernmental Review of Federal Programs* (14 July 1982), which requires federal agencies to cooperate with and consider state and local views in implementing a federal proposal. EO 12372 is implemented by the Air Force in accordance with Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*.

1.5.2 Permits

The contractor would be required to obtain an Air Force Form 103 *Base Civil Engineer Work Clearance Request* permit (work permit) prior to any construction activities. All underground utilities locations would need to be identified prior to any construction activities. The contractor would also ensure that a stormwater pollution prevention plan (SWPPP) was completed and approved before initiating construction activities. Also, an Environmental Resource Permit for stormwater management and wetland protection from the Northwest District Office of the Florida Department of Environmental Protection (FDEP) would be required.

1.5.3 Other Regulatory Requirements

The EA considers all applicable laws and regulations, including but not limited to the following:

- *Clean Air Act* (42 United States Code [USC] 7401 et seq.)
- *Clean Air Act Amendments of 1990* (CAAA) (42 USC 7401 et seq.)
- EO 11990, *Protection of Wetlands* (24 May 1977)
- *Clean Water Act* (CWA) (33 USC 1251 et seq.)
- Section 404 of the CWA (33 USC 1251 et seq., 40 CFR 232.2)
- Section 10 of the *Rivers and Harbors Act of 1899* (33 USC 403)
- EO 11988, *Floodplain Management* (24 May 1977)
- *Coastal Zone Management Act* (16 USC 1451-1456)
- *Endangered Species Act* (ESA) (16 USC 1531-1542)
- *Pollution Prevention Act* (42 USC 13101 and 13102 et seq.)
- *Archaeological Resources Protection Act* (ARPA) (16 USC 470 et seq.)
- *National Historic Preservation Act* (16 USC 470)
- *American Indian Religious Freedom Act* (42 USC 1996)
- *Protection of Historic Properties* (36 CFR 800)
- *Native American Graves Protection and Repatriation Act of 1991* (25 USC 3001 et seq.)
- *Resource Conservation and Recovery Act* (RCRA) (40 CFR Parts 240-244, 257, 258, 260 et seq.)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (42 USC 9610)

- *Toxic Substance Control Act* (15 USC 2601 et seq.)
- *Superfund Amendments and Reauthorization Act* Title III (40 CFR 300 et seq.)
- *Emergency Planning and Community Right-to-Know Act* (16 USC 116)
- EO 12580, *Superfund Implementation* (23 January 1987)
- *Occupation Safety and Health Act* (29 USC 651 et seq.)
- *Energy Independence and Security Act* (Public Law 110-140)
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994)

1.6 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters.

- Chapter 1* Contains a statement of the purpose of and need for action, the location of the proposed and alternative actions, identification of the decision to be made, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the document.
- Chapter 2* Describes the history of the formulation of alternatives, identifies alternatives eliminated from further consideration, provides a detailed description of the Proposed Action, describes the No-action and other action alternatives, summarizes other actions announced for Tyndall AFB and the surrounding community, provides a comparison matrix of environmental effects for all alternatives, identifies the preferred alternative, and describes mitigation measures.
- Chapter 3* Contains a general description of the current conditions of the resources that potentially could be affected by the proposed or alternative actions.
- Chapter 4* Provides an analysis of the environmental consequences of the proposed and alternative actions.
- Chapter 5* Lists preparers of this document.
- Chapter 6* Lists persons and agencies consulted in the preparation of this EA.
- Chapter 7* Lists source documents relevant to the preparation of this EA.

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Chapter 2

Description of the Proposed Action and Alternatives

CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter has nine parts: a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a description of the Proposed Action, a description of the PDA, a description of the No-action Alternative, identification of other proposed actions planned for Tyndall AFB and the surrounding community, a summary of environmental impacts of all alternatives, identification of the preferred alternative, and a table of proposed mitigation measures.

2.1 HISTORY OF THE FORMULATION OF ALTERNATIVES

The alternatives developed for the analysis at Tyndall AFB are designed to capture the range of possible development and activity levels from the No-action Alternative to the PDA. The General Plan developed for Tyndall AFB identifies specific CIP projects, while the Capability Analysis for Tyndall AFB identifies the expansion potential of the current mission activity. The projects and potential development defined in both of these documents would occur between the years 2009 and 2013. Based on these documents, three viable installation development alternatives were identified.

- No-action Alternative – Continue use of existing facilities at Tyndall AFB and continue technical training.
- Proposed Action – Implement construction of facilities to accomplish the CIP including demolition of facilities that are either dilapidated or in the footprint of proposed CIP construction.
- PDA – Implement all of the projects contained within the Proposed Action, as well as the development of available land at Tyndall AFB to the maximum extent possible.

2.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

A range of development scenarios were considered as alternatives. These alternatives allowed for developing various percentages of developable land (as identified in the *2008 Tyndall AFB Natural Infrastructure Assessment*) over and above existing development, in addition to implementing the CIP. A 20 percent development scenario would not leave sufficient headspace for CIP implementation and a 100 percent development scenario would be unrealistic for a 5-year period.

Additional alternatives associated with an incremental approach to implementing the CIP were not considered. Such alternatives were eliminated because the projects included in the CIP provide for critical infrastructure required to achieve goals for installation development in accordance with the Installation General Plan. Since all of the projects identified in the General Plan are required to effectively accomplish the installation's mission, implementing only part of the CIP would not meet the agency's purpose and need. Analyzing the impact of the entire CIP also provides a comprehensive look at planned installation development within the planning timeframe contained in the General Plan. This approach prevents "piecemeal" analysis of the

impacts associated with installation development and provides for better assessment of cumulative impacts.

Additionally, the option of leasing space off-base for training and support requirements was eliminated because there are no facilities in the local community capable of supporting any of these requirements.

2.3 DETAILED DESCRIPTION OF THE PROPOSED ACTION

2.3.1 Flying Operations

In discussing flying operations at an airfield, it is helpful to define the following terms:

- Sortie: A sortie is defined as a single military aircraft flight from initial takeoff through termination landing.
- Aircraft Operation: An aircraft operation is defined as one takeoff/departure, one approach/landing, or half of a closed pattern.
- Closed Pattern: A closed pattern consists of two operations, a takeoff/departure and an approach/landing.

As a result, one sortie will always consist of at least two aircraft operations (a takeoff/departure and an approach/landing) but will often have more than two operations depending upon the number of closed patterns flown. Each phase of flight utilizes a predetermined flight path.

Under the Proposed Action, no new aircraft would be stationed at Tyndall AFB. Flying operations, which typically fluctuate somewhat from year to year, would not increase under the Proposed Action. Therefore, the Proposed Action level of activity would be the same as the baseline. Currently, approximately 114,000 annual aircraft operations occur at Tyndall AFB. The major aircraft assigned to Tyndall AFB include: the F-15 *Eagle*, a twin-engine fighter, the F-22 *Raptor*, also a twin-engine fighter, and the MU-2, a turbo-propeller driven training aircraft. Additionally, a wide variety of transient aircraft use Tyndall AFB over the course of a given year, including heavy cargo jet aircraft, bombers, and fighters from other Air Force bases. Of particular note, an Air Force Weapons System Evaluation Program (WSEP) operates in the offshore ranges south of the base. Various flying units temporarily deploy to Tyndall AFB for approximately two weeks at time, typically bringing 10 aircraft each time. Twelve WSEP deployments on average occur annually. Table 2-1 presents the current aircraft inventory and the end state inventory after implementation of the Proposed Action.

Table 2-1 Aircraft Counts

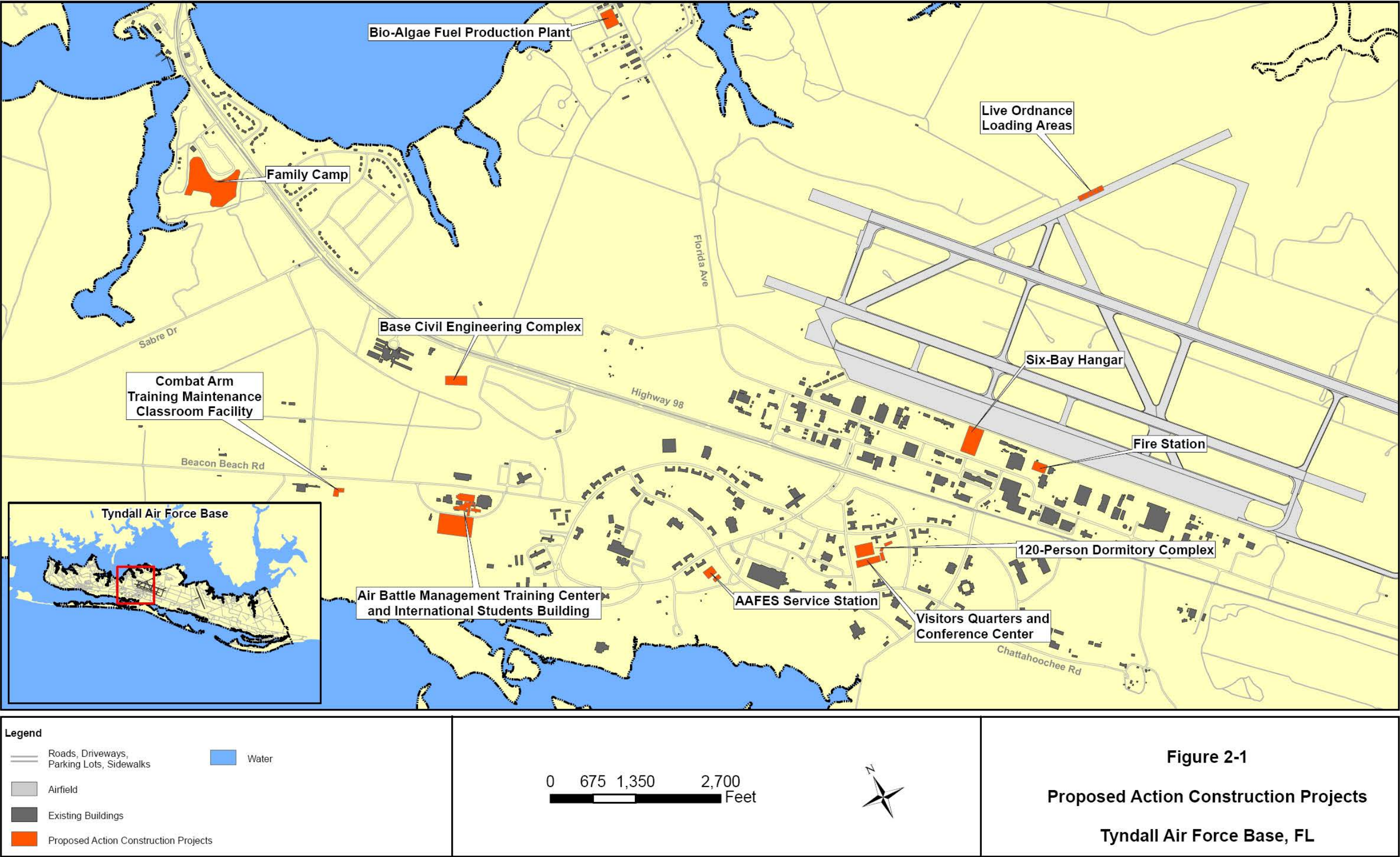
Aircraft Type	FY 2007 Baseline	Additional Aircraft/ Percent Increase	Proposed Action End State
Based			
F-15	48	0	48
F-22	30	0	30
Air 1st			
MU-2	8	0	8
Aero Club			
C-172	3	0	3
C-210	52	0	52
Weapons Evaluation Group			
E-9	2	0	2
QF-4	50	0	50
TOTAL	193	0	193

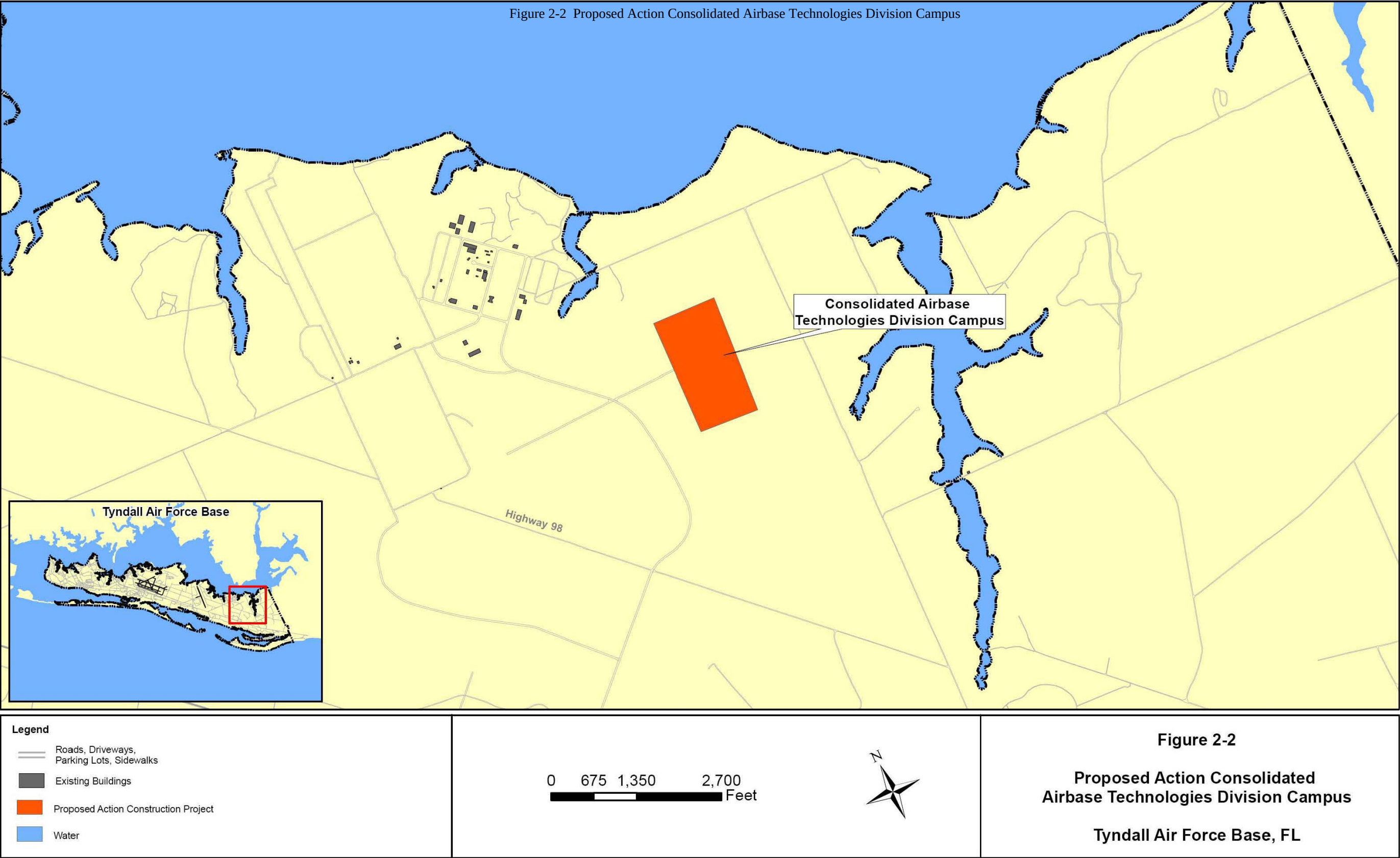
Tyndall AFB flying missions would continue to use existing Tyndall AFB Special Use Airspace (SUA). Training for the missions would continue to occur in overland and overwater SUA, the details of which are presented in Chapter 3.

2.3.2 Construction and Demolition

The Proposed Action would construct and demolish facilities and infrastructure at Tyndall AFB to improve effectiveness of training, enhance quality of life, replace old, inadequate facilities, and correct current deficiencies. There would be no new missions and no additional personnel assigned to Tyndall AFB as a result of the Proposed Action. Figures 2-1 and 2-2 show the buildings to be constructed at Tyndall AFB, and Figure 2-3 shows the buildings to be demolished as part of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Tyndall AFB. Table 2-2 contains information on the proposed projects.

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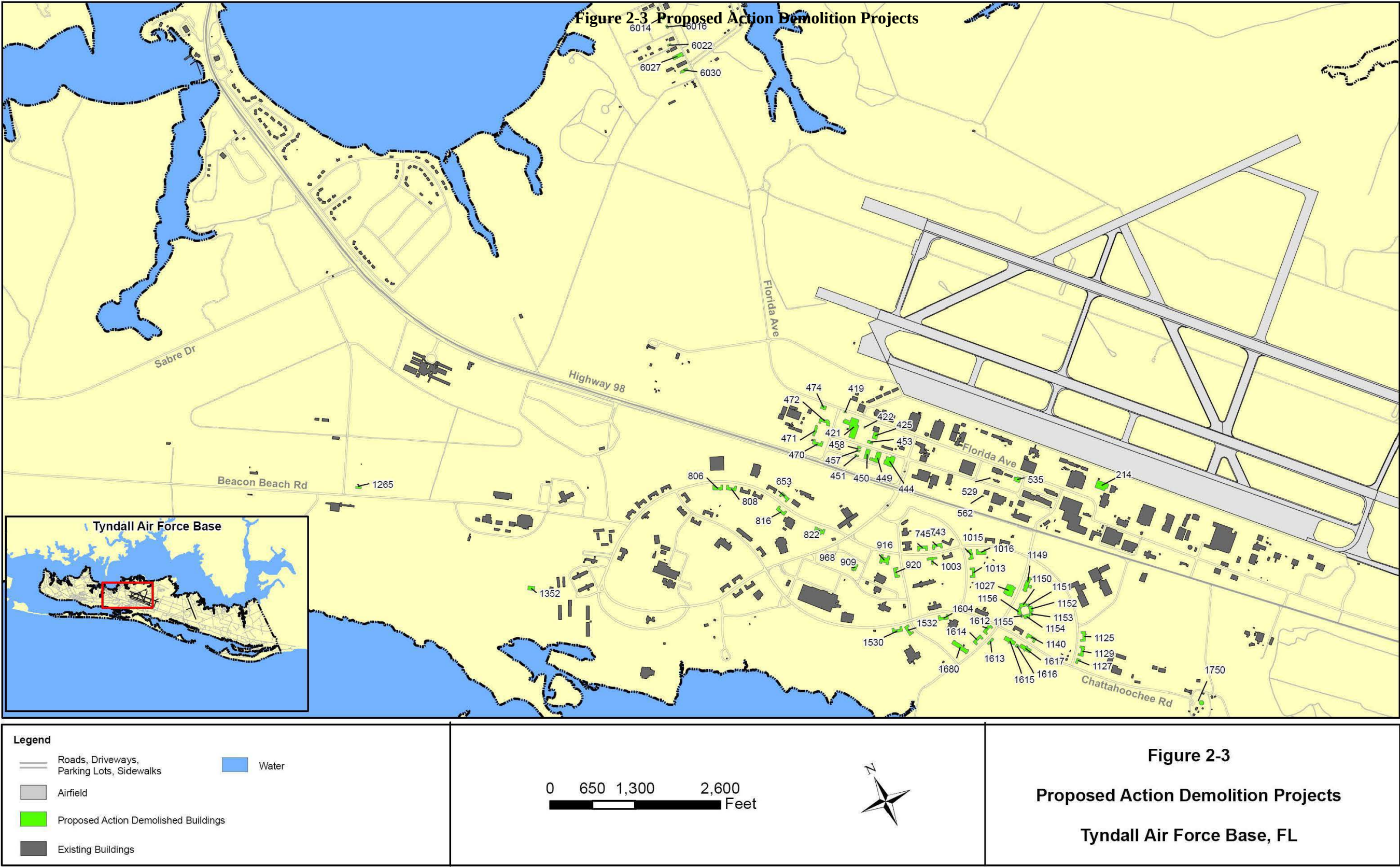


Table 2-2 Proposed Action Construction and Demolition

Project Type	Building Name/Project Description	Programmed Fiscal Year	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Construction	120-Person Dormitory Complex. Construct a new dormitory complex to replace Buildings 1150, 1152, and 1154. This project would be Phase 2 of the Dorm Master Plan and located along Suwannee Avenue.	2010		48,000	0	1.10	1.56
Construction	Army Air Force Exchange Service - Service Station. Replace the existing station and shoppette with a new facility that includes a new shoppette, auto parts store, auto service/repair bays, and fuel pumps. The entrance road into this area will be realigned to match entrance between the Burger King and the Commissary.	2010		2,214	0	0.05	0.69
Construction	Combat Arms Training and Maintenance Classroom Facility. Replace the existing Combat Arms Training and Maintenance classroom building with a new facility. The existing Combat Arms Training and Maintenance classroom is a vintage 1950's facility (Building 1265) that does not meet Engineer Technical Letter criteria and is located on the north side of Beacon Beach Road. The new facility will include a classroom, offices for six personnel, a vault, weapons repair and storage, and toilet facilities. The entire facility would be enclosed with chainlink fencing.	2010		8,000	0	0.18	0.34
Construction	Consolidated Airbase Technologies Division Campus. Project is to be comprised of 12 new facilities constructed in a vacant area of the base near the Air Force's Silver Flag training site.	2010		215,439	0	4.95	43.37
Construction	Six Bay Hangar. Project will include a hangar access apron and airfield connecting taxiways. Construct Consolidated Squadron Operations/Aircraft Maintenance Unit/hangar (new mission) adequately sized, configured, and secure facility providing squadron operations, covered maintenance space and maintenance management space is required to support the beddown of the next generation, air superiority fighter at Tyndall Air Force Base. Antiterrorism force protection measures will be incorporated.	2010		70,000	0	1.61	2.36
Construction	Construct Weapon System Evaluation Program Operation Center. Construct a building to replace Buildings 1275, 1277, and 1279. The building will be located in the 1800 area. This building will become the operations center for the air controllers supporting the unmanned drones and the Weapon System Evaluation Program exercises. Expand the existing parking lot, pave the entire area including the semi-circular drive, and layout the parking stalls and traffic aisles to run north and south.	2009		22,500		0.52	5.47
Construction	Algae Bio-Fuel Plant. Construct plant to produce "green" gasoline and/or "green" diesel.	2012		3,000		0.07	1.26
Construction	Base Civil Engineering (CE) Complex. Construct a facility to replace and relocate base existing Base CE Complex from flightline area to a new location. The new CE complex will be sited in an area located west of the Cleveland Gate, south of US Highway 98.	2012		106,000	0	2.43	1.13
Construction	Family Camp. Clear and grub seven acres of land and construct 30 Recreational Vehicle sites. Site to include one concrete parking slab and one slab with integral picnic table and shade. Each site to be provided with water, sewer, cable television, electrical service hook-ups, and area lighting.	2012		304,920		7.00	7.87
Construction	Fire Station. Construct fire station to replace existing fire station along flightline. This fire station will support both crews and equipment required to respond to aircraft fires on the airfield and structural fires on base.	2012		34,000	0	0.78	0.67
Construction	Construct Live Ordnance Loading Area bomb build up pad/suspect vehicle parking area near the ammo area. This will include a paved or cement pad (150-foot x 150-foot) with large truck turn-around space and possibly a roof (100-foot x 50-foot). Additionally, the completion of the north road will connect to the road near Horseshoe Lake. This will give ammo personnel a back escape route in the event ammo road is the scene of a mishap and they need to evacuate.	2012		32,452	0	0.74	0.75
Construction	Visitors Quarters Billeting and Conference Center. Construct a consolidated Visitors Quarters billeting/conference center facility located at the intersection of Illinois Avenue and Mississippi Road.	2012		90,000	0	2.07	0.88
Demolition	Headquarters Administrative Offices	2009	444	0	19,362	(0.44)	(0.43)
Demolition	Headquarters Administrative Offices	2009	471	0	5,079	(0.12)	(0.13)

Table 2-2 Proposed Action Construction and Demolition (Continued)

Project Type	Building Name/Project Description	Programmed Fiscal Year	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Demolition	Headquarters Administrative Offices	2009	472	0	7,210	(0.17)	(0.22)
Demolition	Tech Training Classroom	2009	535	0	3,573	(0.08)	(0.15)
Demolition	Headquarters Administrative Offices	2009	1125	0	6,936	(0.16)	(0.19)
Demolition	Headquarters Administrative Offices	2009	1127	0	2,600	(0.06)	(0.07)
Demolition	Headquarters Administrative Offices	2009	1129	0	6,936	(0.16)	(0.19)
Demolition	Headquarters Administrative Offices	2009	1140	0	6,936	(0.16)	(0.18)
Demolition	Cadet Quarters	2009	1532	0	6,936	(0.16)	(0.18)
Demolition	Cadet Quarters	2009	1604	0	6,936	(0.16)	(0.18)
Demolition	Cadet Quarters	2009	1612	0	6,936	(0.16)	(0.18)
Demolition	Sewage Treatment Disposal	2009	1750	0	4,012	(0.09)	(0.09)
Demolition	Family Support Center	2010	743	0	5,701	(0.13)	(0.18)
Demolition	Family Support Center	2010	745	0	6,936	(0.16)	(0.18)
Demolition	Headquarters Administrative Offices	2010	822	0	7,442	(0.17)	(0.23)
Demolition	Recreation Library	2010	916	0	11,773	(0.27)	(0.31)
Demolition	Headquarters Administrative Offices	2010	920	0	6,936	(0.16)	(0.18)
Demolition	Army and Air Force Exchange Service - Service Station	2010	968	0	2,214	(0.05)	(0.07)
Demolition	Post Office Center	2010	1003	0	5,614	(0.13)	(0.16)
Demolition	Recreation Center	2010	1027	0	18,651	(0.43)	(0.49)
Demolition	Permanent Party Dormitory	2010	1149	0	33,682	(0.77)	(0.30)
Demolition	Permanent Party Dormitory	2010	1150	0	19,987	(0.46)	(0.14)
Demolition	Lounge/Dayroom	2010	1151	0	2,615	(0.06)	(0.03)
Demolition	Permanent Party Dormitory	2010	1152	0	10,125	(0.23)	(0.12)
Demolition	Lounge/Dayroom	2010	1153	0	3,315	(0.08)	(0.05)
Demolition	Permanent Party Dormitory	2010	1154	0	10,125	(0.23)	(0.12)
Demolition	Lounge/Dayroom	2010	1155	0	2,615	(0.06)	(0.03)
Demolition	Technical Training Student Housing	2010	1156	0	10,125	(0.23)	(0.13)
Demolition	Combat Arm Training Maintenance Classroom Facility	2010	1265	0	1,819	(0.04)	(0.06)
Demolition	Cadet Quarters	2010	1613	0	3,105	(0.07)	(0.08)
Demolition	Dormitory Visiting Airman’s Quarters	2010	1615	0	24,111	(0.55)	(0.25)

Table 2-2 Proposed Action Construction and Demolition (Continued)

Project Type	Building Name/Project Description	Programmed Fiscal Year	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Demolition	Storage Shed	2011	419	0	600	(0.01)	(0.02)
Demolition	CE Administrative Offices	2011	421	0	37,897	(0.87)	(0.93)
Demolition	CE Storage Shed	2011	422	0	612	(0.01)	(0.01)
Demolition	CE Storage Shed	2011	425	0	7,000	(0.16)	(0.16)
Demolition	CE Storage Shed	2011	449	0	12,710	(0.29)	(0.33)
Demolition	CE Storage Shed	2011	450	0	12,710	(0.29)	(0.21)
Demolition	CE Hazard Storage/Shed	2011	451	0	1,482	(0.03)	(0.03)
Demolition	CE Maintenance Shop	2011	453	0	3,008	(0.07)	(0.08)
Demolition	CE Storage Facility	2011	457	0	1,250	(0.03)	(0.04)
Demolition	CE Storage Facility	2011	458	0	1,250	(0.03)	(0.04)
Demolition	CE Administrative Offices	2011	470	0	9,648	(0.22)	(0.19)
Demolition	CE Maintenance Shop	2011	474	0	4,000	(0.09)	(0.11)
Demolition	Disaster Preparedness	2011	909	0	10,636	(0.24)	(0.12)
Demolition	Cadet Quarters	2011	1016	0	6,936	(0.16)	(0.19)
Demolition	CE Storage Shed	2011	1352	0	6,171	(0.14)	(0.14)
Demolition	CE Storage Shed	2011	6014	0	1,317	(0.03)	(0.04)
Demolition	CE Pavement/Grounds Facility	2011	6016	0	1,286	(0.03)	(0.03)
Demolition	CE Maintenance Facility	2011	6022	0	1,330	(0.03)	(0.03)
Demolition	Fire Station	2012	214	0	43,104	(0.99)	(0.48)
Demolition	Navigational Aid Shop	2012	529	0	224	(0.01)	(0.01)
Demolition	Air Force Communication Squadron Maintenance Facility	2012	653	0	6,936	(0.16)	(0.18)
Demolition	Dormitory	2012	806	0	6,963	(0.16)	(0.18)
Demolition	Communication Facility	2012	808	0	6,963	(0.16)	(0.19)
Demolition	Dormitory	2012	816	0	6,963	(0.16)	(0.19)
Demolition	Cadet Quarters	2012	1013	0	6,936	(0.16)	(0.18)
Demolition	Headquarters Administrative Offices	2012	1015	0	6,936	(0.16)	(0.18)
Demolition	Cadet Quarters	2012	1530	0	6,936	(0.16)	(0.19)
Demolition	Cadet Quarters	2012	1614	0	6,936	(0.16)	(0.18)
Demolition	Training Lounge Support Building	2012	1616	0	1,681	(0.04)	(0.05)

Table 2-2 Proposed Action Construction and Demolition (Continued)

Project Type	Building Name/Project Description	Programmed Fiscal Year	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Demolition	Dormitory Visiting Airman’s Quarters	2012	1617	0	24,111	(0.55)	(0.25)
Demolition	Permanent Party Dormitory	2012	1680	0	25,960	(0.60)	(0.38)
Demolition	CE Maintenance Shop	2012	6027	0	7,728	(0.18)	(0.20)
Demolition	CE Pavement/Grounds Facility	2012	6030	0	4,000	(0.09)	(0.10)
Totals				936,525	552,563	8.83	55.41
Notes: CE – Civil Engineering SF – Square Feet							

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2.3.3 Personnel Changes

There are currently 5,342 military and 2,577 civilian personnel assigned to Tyndall AFB. Including dependents, Tyndall AFB supports approximately 22,471 total personnel (Cintron 2008). There would be no additional personnel assigned to Tyndall AFB as a result of the Proposed Action.

2.4 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the No-action Alternative, the Air Force would not construct, renovate, or demolish any facilities or infrastructure at Tyndall AFB. Additionally, aircraft operations would not change from current conditions.

2.5 DESCRIPTION OF OTHER ACTION ALTERNATIVES

2.5.1 Potential Development Alternative

A Capability Analysis was completed for the installation that defined the total development potential, or development headroom, for Tyndall AFB. Because it is an unrealistic expectation for the Air Force to consume 100 percent of the development headroom within the next five to eight years, a more realistic growth scenario of 75 percent of the potential development headroom was established for the installation.

The PDA represents a broader approach to installation and mission development at Tyndall AFB. The PDA includes all of the projects contained within the Proposed Action, as well as projects that would develop 75 percent of developable land on Tyndall AFB. This level of development would be substantially higher than the current development level.

2.5.1.1 Flying Operations

Under the PDA, aircraft operations would increase by 60 percent to approximately 183,000 annual operations. This increase may be achieved by increasing the number of hourly operations, increasing the flying window during which operations occur (i.e., flying more hours in a given day), or some combination of both. This increase would not, however, exceed the design throughput of the airfield of 214,500 annual operations under Instrument Flying Rules or 449,280 annual operations under Visual Flying Rules. No specific plans for a beddown of additional aircraft or flying units is proposed, rather, this alternative assumes growth in the mission of the existing aircraft and the WSEP deployments. Table 2-3 presents the increase in flying operations that would result from the implementation of the PDA.

Table 2-3 Aircraft Operations

Aircraft Type ^a	FY 2008 Baseline and Proposed Action			Potential Development Alternative			Percent Increase in Average Daily Operations
	Annual Sorties	Average Annual Operations ^(b)	Average Daily Operations ^(c)	Annual Sorties	Average Annual Operations ^(b)	Average Daily Operations ^(c)	
C-172	2,808	5,616	18	4,493	8,986	28.8	60
C-210	52	104	0.33	83	166	0.53328	60
F-15	9,714	62,752	257	50,202	100,404	410.816	60
F-22	5,730	31,728	129.82	25,382	50,764	207.712	60
MU-2	2,080	4,160	16	3,328	6,656	25.6	60
F-15A	107	214	1.62	171	342	2.592	60
F-15E	223	416	3.15	333	666	5.04	60
F-16A	109	214	1.62	171	342	2.592	60
F-16C	838	1,628	12.33	1,302.5	2,605	19.728	60
F-22	182	364	2.76	291	582	4.416	60
GR-1	30	50	0.38	40	80	0.608	60
E-9	246	491	1.89	392.5	785	3.024	60
QF-4	1,315	2,630	10.76	2,104	4,208	17.216	60
TOTAL	23,434	110,367	455.66	88,293	176,587	728.6773	60
Notes: (a) Transient aircraft sorties (excluding WSEP) are not presented in this table as they represent less than 2 percent of total aircraft operations at Tyndall AFB. (b) Based upon historical flying operations at Tyndall AFB, the following aircraft operations per sortie factors were used for based aircraft: C-172 (2.00 operations/sortie); C-210 (2.00 operations/sortie); F-15 (6.96 operations/sortie); F-22 (5.96 operations/sortie); MU-2 (2.0 operations/sortie); MU-2 (2.0 operations/sortie). (c) Average Daily Operations equals the Average Annual Operations divided by the flying days per year which are: 312 days per year (Aero Club – C172/C210), 244.4 days per year (F-15 and F-22), and 260 days per year (MU-2).							

2.5.1.2 Construction and Demolition

Under the PDA, approximately 6,442 acres of land would be developed at Tyndall AFB, resulting in approximately 2.3 million square feet of additional facility space and 983 acres of additional impervious cover that would be added to the installation. This would represent development of approximately 75 percent of the developable land on Tyndall AFB, an 85 percent increase in the amount of facility space, and a 108 percent increase in total impervious cover on the installation.

For comparison purposes, the development defined in the PDA would incorporate the construction and demolition activities defined in the Proposed Action, the PDA programmed projects, as well as the broader installation expansion. Table 2-4 provides details of the components of the PDA.

Table 2-4 Components of the Potential Development Alternative

	Demolition (SF)	Construction (SF)	Additional Facility Space (acres)	Impervious Cover (acres)^(b)
Projects from the Proposed Action	545,627	936,525	8.83	55.41
PDA Programmed Projects	218,181	311,313	2.15	16.57
Broad Installation Expansion	-- ^(a)	1,038,341	102.94	911.15
Total PDA Development	763,808	2,286,179	113.92	983.13
Notes: PDA = Potential Development Alternative SF = Square Feet ^(a) Demolition activities beyond the Proposed Action and Programmed Projects are not identified for the PDA. If additional demolition activities were to occur under the PDA, more space would become available for construction projects. ^(b) Impervious cover includes facility footprint and associated hard surfaces, and is based upon a development intensity factor derived from an analysis of current installation development patterns (i.e., parking, sidewalks, and driveways).				

Collectively, the Proposed Action projects identified in Table 2-3 and PDA programmed projects identified in Table 2-5 would consume approximately 55 percent of the development potential as it relates to facility space development. These projected projects would also consume 9.5 percent of the development potential as it relates to impervious cover. Figures 2-4 through 2-7 show the programmed construction and demolition projects under the PDA.

The PDA installation expansion (beyond the Proposed Action and programmed projects) would allow for an additional 1.03 million square feet of facility space development (45 percent of development potential) and an additional 889 acres of impervious cover (90.5 percent of development potential) over and above the programmed projects.

The overall developable land on Tyndall AFB as defined in the Capability Analysis (Appendix B) is 6,874.4 acres of land. These areas do not have any environmental or developmental constraints.

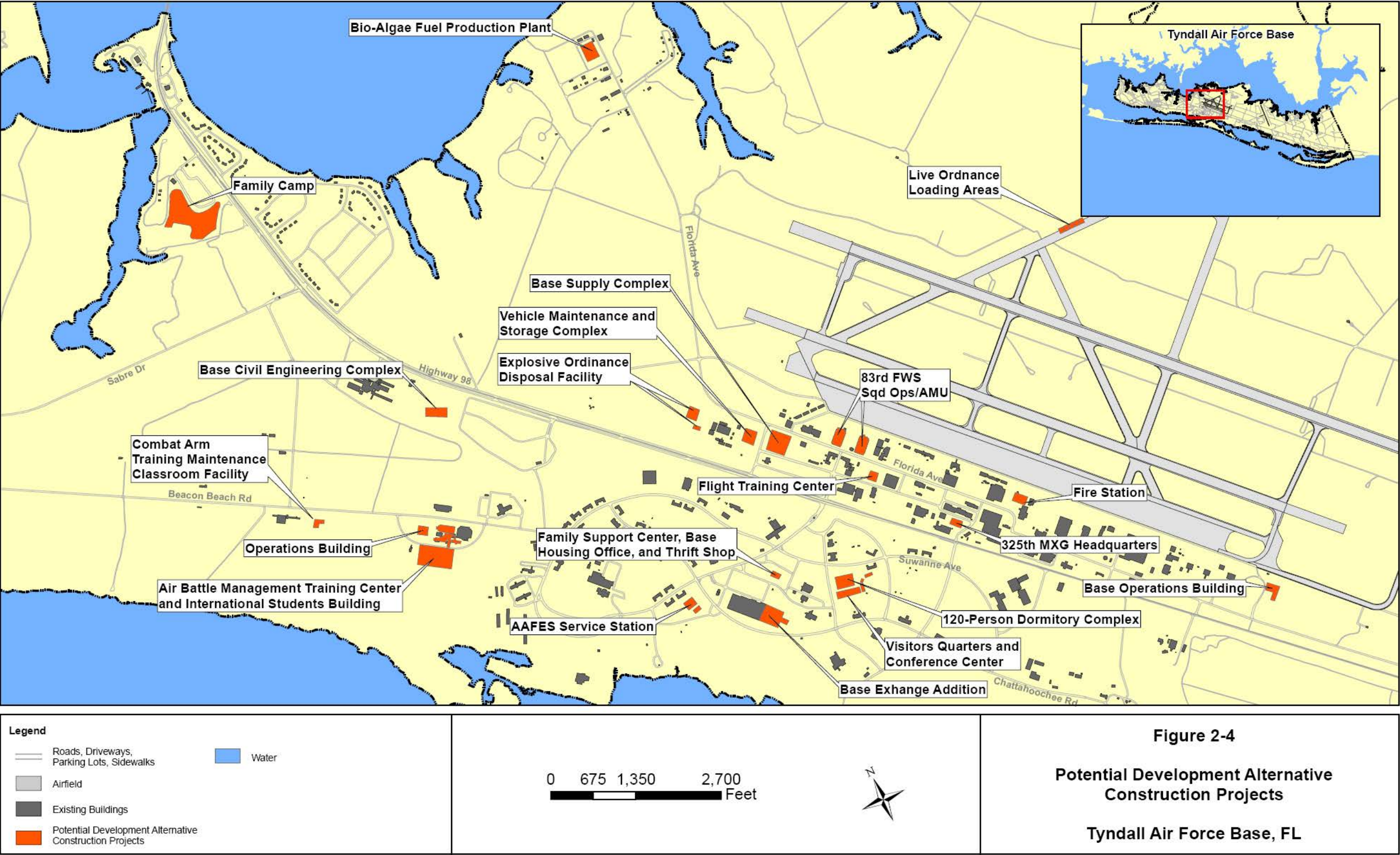
Under the PDA, development would occur only on developable land that did not possess land-use compatibility constraints and was free from environmental constraints. Land-use compatibility constraints include: Safety Quantity-Distance Arcs, Small Arms Range Safety Zones/Military Munitions Response Program Sites, Air Installation Compatible Use Zones (AICUZ), and a 150-foot anti-terrorism/force protection buffer zone along the installation perimeter. Environmental constraints include areas designated as wetlands or within the 100-year floodplain, Environmental Restoration Program (ERP) sites, or Non-Environmental Restoration Account Compliance Cleanup sites. Table 2-5 shows a comparison of development for the Proposed Action, the PDA, and the No-action Alternative.

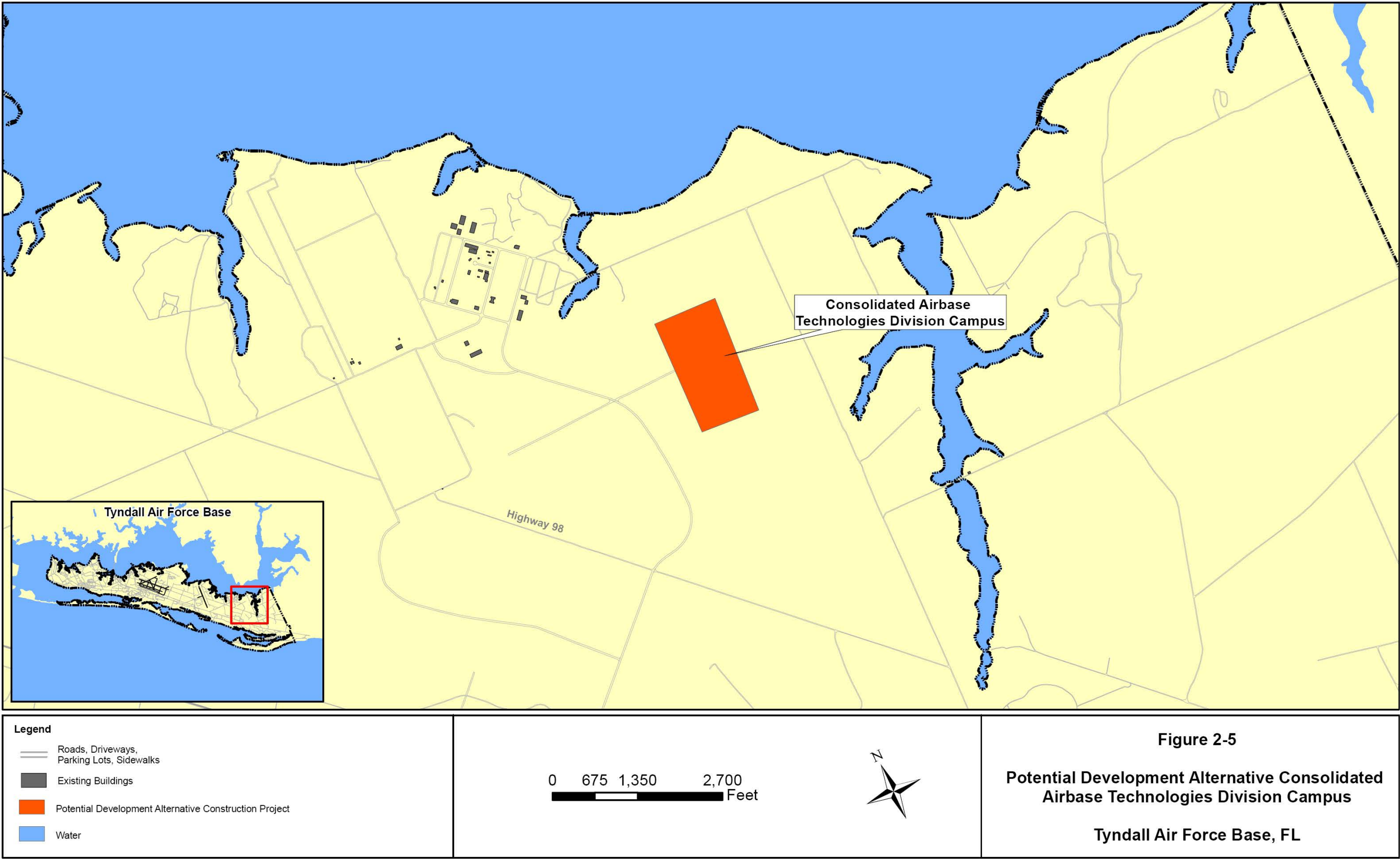
Table 2-5 Comparison of Installation Development Alternatives

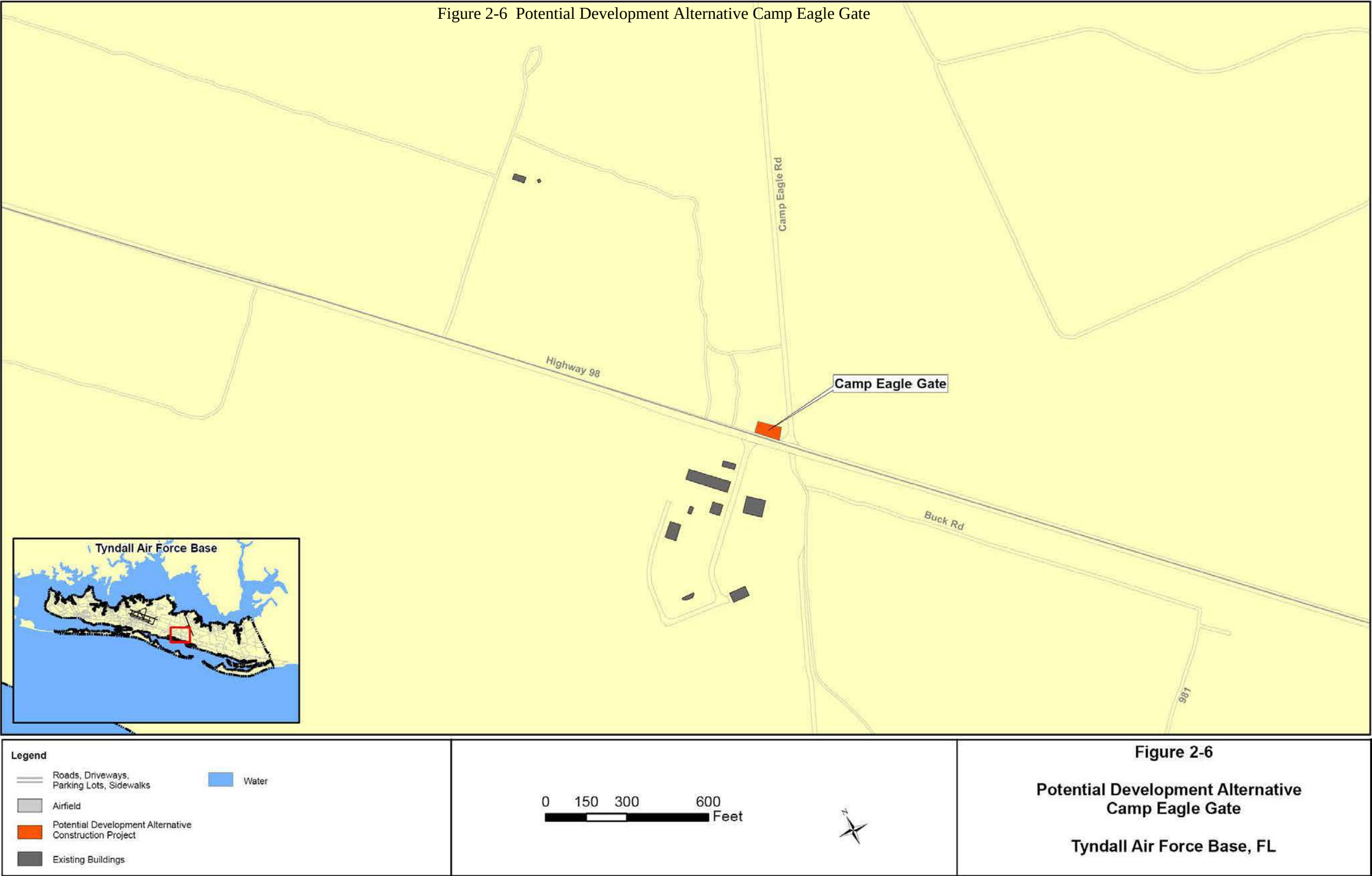
	Proposed Action	PDA	No-action Alternative
Demolition (SF)	552,563	770,744	0
Construction (SF)	936,525	2,286,179	0
Additional Facility Space (acres)	8.83	113.92	0
Impervious Cover (acres) ^(b)	55.41	983.13	0
Notes: PDA = Potential Development Alternative SF = Square Feet ^(a) Demolition activities beyond the Proposed Action and Programmed Projects are not identified for the PDA. If additional demolition activities were to occur under the PDA, more space would become available for construction projects. ^(b) Impervious cover includes facility footprint and associated hard surfaces, and is based upon a development intensity factor derived from an analysis of current installation development patterns (i.e., parking, sidewalks, and driveways).			

2.5.1.3 Personnel and On-base Residents

An additional 5,184 personnel would be added under the PDA, resulting in a total end state installation population of 27,655 personnel. Under the PDA, approximately 3,750 of the incoming personnel would live off base.







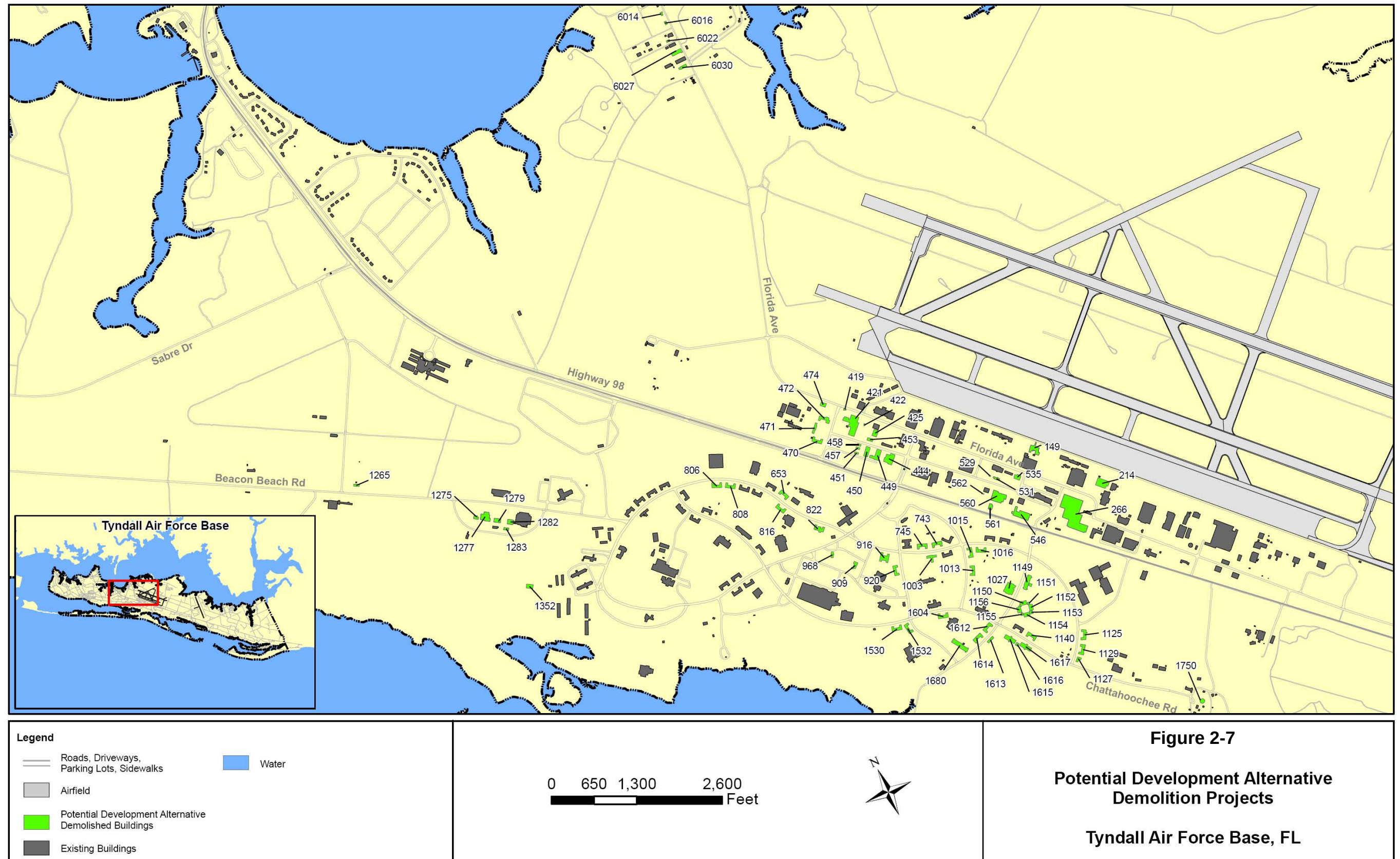


Table 2-6 PDA Construction and Demolition

Project Type	Building Name/Project Description	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Construction	Base Operations Building. Construct building adjacent to new heavy aircraft transient parking ramp. The building should include space for transient alert crew required to generate aircraft operations on the two transient ramps. A storage shed for Materials Handling Equipment is also required.		12,000	0	0.28	0.76
Construction	Construct Flight Training Center.		28,000	0	0.64	0.45
Construction	Construct 325th Mission Support Group Headquarters. Construct new facility to consolidate maintenance administrative offices for 325th Maintenance Group, 325th Maintenance Operations Squadron, and 325th Maintenance Squadron.		50,000	0	1.15	0.45
Construction	Construct 83rd Fighter Weapons Squadron Operations/Aircraft Maintenance Unit to replace multiple old, undersized buildings required to support Weapon System Evaluation Program. This building will provide operations space for pilots of QF-4 aircraft and transient pilots.		26,000	0	0.60	1.99
Construction	Construct Base Supply Complex. Construct a facility to support base supply functions (high-bay warehouse, shipping and receiving dock, aircraft parts center, administrative offices, flammable storage building, open storage shed, and open storage yard) just east of Dixie Road.		92,000	0	2.11	2.32
Construction	Vehicle Maintenance and Storage Complex. Replace existing vehicle administration, maintenance, and parking facilities. New facility will be sized to support a reduced fleet of Government Operated Vehicles and provide additional land for future development along flightline. This facility will be constructed between Dixie Road and the Air Operation Center facility.		15,000	0	0.34	0.97
Construction	Construct Explosive Ordnance Disposal Facilities. Construct a new facility for the explosive ordnance disposal team that includes a building and a storage yard for their equipment. This facility will be located west of the Southeast Air Defense Sector /1st Air Force complex.		6,000	0	0.14	0.89
Construction	Construct Family Support Center. Construct a new Family Support Center that will include the Base Housing Offices, Thrift Shop, and Airman’s Attic. These related functions are scattered in three old building constructed during World War II. These functions belong in the Community Center.		19,000	0	0.44	0.29
Construction	Construct Operations Building. Construct an Operations Building with simulation laboratories for both live and simulated exercises. This building will replace labs currently located in Buildings 1270, 1282, and 1283. The building will also have spaces suitable for conducting classified briefings and exercises. It will be necessary to relocate multiple utility lines that lay under the site of this building.		30,000	0	0.69	0.51
Construction	Construct Security Forces approved secure remote access gate at Camp Eagle gate for transport of drone equipment. (Non Military Construction-Simplified Acquisition of Base Engineering Requirements Project)		4,313	0	0.10	0.10
Renovation	Add/Alter Base Exchange. Expand the current Base Exchange to enlarge the furniture and household appliance sales and warehouse areas, provide a larger Food Court with a video arcade, and relocate the Military Clothing Sales Store, Class VI Store, Laundry/Dry Cleaners, and Branch Post Office. These last four functions are currently located in older, scattered buildings that need to be demolished. The outdoor sales area will be relocated and expanded. It will be necessary to relocate a stormwater drain along the east face of the current Base Exchange.		29,000	0	0.67	2.15

Table 2-6 PDA Construction and Demolition (Continued)

Project Title	Building Name	Building Number	New Construction (SF)	Demolition (SF)	Facility Space (Acres)	Impervious Cover (Acres)
Demolition	Demolish existing Base Operations Building.	149	0	11,440	(0.26)	(0.32)
Demolition	Demolish existing Base Supply Complex.	266	0	127,027	(2.92)	(3.00)
Demolition	Demolish Buildings 531 and 546.	531 and 546	0	25,153	(0.58)	(0.62)
Demolition	Vehicle Maintenance and Storage Complex. Demolish existing facilities and complete environmental remediation of existing site.	560, 561, and 562	0	27,497	(0.63)	(0.74)
Demolition	Demolish Weapon System Evaluation Program Operation Center. Demolish Buildings 1275, 1277, and 1279 to construct new Weapon System Evaluation Program Operation Center.	1275, 1277, and 1279	0	20,318	(0.47)	(0.76)
Demolition	Demolish Operations Buildings. Demolish Buildings 1282 and 1283.	1282 and 1283	0	6,746	(0.15)	(0.25)
Totals from Potential Development Alternative			311,313	218,181	2.15	16.57
Totals from Proposed Action			936,525	552,563	8.83	77.29
Grand Totals			1,247,838	770,744	10.98	93.86
Notes: SF – square feet						

2.6 OTHER ACTIONS ANNOUNCED FOR TYNDALL AFB AND SURROUNDING COMMUNITY

This EA also considers the effects of cumulative impacts (40 CFR 1508.7) and concurrent actions (40 CFR 1508.25[1]). A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

Other actions announced for Tyndall AFB that could occur during the same time period as the proposed or alternative actions are identified in Table 2-6. This table also includes the estimated total square feet of construction and demolition associated with each project. No other actions were planned for the surrounding community that could occur in the foreseeable future or during the same time as the proposed or alternative actions.

Table 2-7 Concurrent Actions at Tyndall AFB

Project	New Construction (SF)	Demolition (SF)
Multi-story Dormitory Construction Project	90,700	70,500
Military Family Housing Privatization	1,231,080	1,255,960
Construct Fitness Center	177,428	20,788
Total	1,499,208	1,347,248
Notes: SF = square feet		

For this analysis, the actions identified in Table 2-7 are addressed from a cumulative perspective and are analyzed in Chapter 4. Given the construction or completion timeframe for each effort, the projects could not be incorporated into the baseline; and, they are not part of Proposed Action or alternatives. More specifically, the land defined for each of the projects identified in Table 2-7 was not considered to be in developable areas on the installation. Therefore, the parcels associated with each action were not considered when defining either the Proposed Action or the PDA. All of the actions defined in Table 2-7 have been evaluated under separate NEPA cover and were incorporated in this analysis for their cumulative value.

2.7 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2-8 summarizes the impacts of the Proposed Action, PDA, and the No-action Alternative.

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action.

2.9 MITIGATION MEASURES

Table 2-9 presents mitigation measures and best management practices anticipated for impacts incurred under the Proposed Action, PDA, and the No-action Alternative.

Table 2-8 Summary of Environmental Impacts

Resource	Proposed Action Implement Capital Improvement Projects and Related Mission Activities	Potential Development Alternative Implement Capital Improvement Projects, Related Mission Activities, and Broad Installation Development. Increase Aircraft Operations by 60 percent.	No Action Alternative No Implementation of Capital Improvement Projects and Related Mission Activities.
Airspace Use and Management	No change to sortie counts or flight operations; therefore, no impacts to airspace use and management.	No change to classification of Tyndall AFB as Class D airspace. No restriction of other air traffic in the vicinity of Tyndall AFB. No need for additional or new controlled airspace or special use airspace or expansion of existing Military Operations Areas.	No change.
Noise	No increase to sortie counts or aircraft operations; therefore, no impacts to noise from flying operations. Increased noise from construction and demolition activities may temporarily cause short-term, localized speech interference or annoyance near construction zones. Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the project.	Extension of noise contours along all axes. Noise level increase from aircraft operations would be below perceptible levels. Impacts from construction related noise would be similar to, but longer in duration than the Proposed Action.	No change.
Land Use	No impacts to land use from flight operations or construction and demolition activities.	Long-term increase in noise from increased air operations would not likely be perceptible to human receptors. Long-term change to land use categories from open space to other land use categories. No impacts to land use compatibility.	No change.
Air Quality	No increase in long-term emissions as there would be no changes in facility mission, operations, or vehicle use. Long-term air emissions would be reduced due to updated controls in new buildings. No change to stationary source emissions. Combustion of fuel by construction equipment would cause a short-term increase in criteria pollutants. Fugitive dust would be created by construction equipment but would be short-term. All emissions would fall below the 10 percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants.	Short-term impacts would be similar to those in the Proposed Action. Long-term increase in emissions from government and personally-owned vehicles, as well as 60 percent increase in aircraft operations.	No change.
Earth Resources	There would be short-term soil disturbance as a result of proposed construction and demolition activities. The soils in the vicinity of the proposed construction projects at Tyndall AFB have been altered over time, and the project areas have been permanently disturbed by existing facilities and paved roads.	Impacts would be similar to those in the Proposed Action; however, construction would occur on approximately 75 percent of the developable land at Tyndall AFB, including some areas not previously disturbed. No changes to topography are expected.	No change.
Biological Resources	Construction of the Consolidated Airbase Technologies Division Campus would fall in a vegetative community; however, wildlife occurring in the area would be expected to relocate to other suitable habitat. The majority of the listed animal and plant species found on Tyndall AFB are not located in the area of any proposed construction or demolition activities. Noise from construction activities, increased traffic, and earth moving activities could potentially temporarily disturb wildlife near the construction areas. This disturbance is expected to be short-term and minor.	No impacts to plant species. Decrease in habitat for wildlife, but relocation to suitable habitat is expected. No impacts to rare, threatened, or endangered species. Impacts to wildlife from construction-related noise would be similar to the Proposed Action.	No change.
Cultural Resources	Proposed demolition and construction within the cantonment area would have no effect on archaeological properties. Proposed construction in undeveloped areas, particularly east of the cantonment area, could potentially impact archaeological sites and represent an adverse effect to historic properties. Survey and evaluations of National Register of Historic Places (NRHP)-eligibility and State Historic Preservation Officer (SHPO) concurrence with eligibility determinations must be conducted. No impacts to the 37 World War II (WWII) historic properties or Buildings 1127 and 1016 from demolition. No effect on historic properties from new construction. Eligibility status of 25 Cold War-era historic resources is unknown. It is recommended that 15 of these resources are ineligible for listing on the NRHP. The remaining Cold War-era resources should be evaluated for NRHP eligibility and SHPO concurrence would be required.	Impacts to archaeological resources would be the same as for the Proposed Action. No impacts to WWII historic properties or buildings 1127, 1016, or 266. No impacts to historic properties from new construction. Eligibility status of 35 Cold War-era historic resources is unknown. It is recommended that 19 of these resources are ineligible for listing on the NRHP. The remaining Cold War-era resources should be evaluated for NRHP eligibility and SHPO concurrence would be required.	No change.
Water Resources	Short-term increase in sediment loading of surface water. No change to groundwater quality; however, potential decrease in groundwater recharge due to increase in impervious cover. No impacts to floodplains.	Impacts to surface water would be the same as the Proposed Action, except that sediment loading would be increased due to increase in impervious cover. Also, there would be an increase in surface water demand due to population increase and subsequent increase in potable water demand. Impacts to groundwater would be the same as the Proposed Action, except that recharge rates would be further decreased from an increase in impervious cover. No impacts to floodplains.	No change.

Table 2-8 Summary of Environmental Impacts (Continued)

Resource	Proposed Action Implement Capital Improvement Projects and Related Mission Activities	Potential Development Alternative Implement Capital Improvement Projects, Related Mission Activities, and Broad Installation Development. Increase Aircraft Operations by 60 percent.	No Action Alternative No Implementation of Capital Improvement Projects and Related Mission Activities.
Hazardous Materials and Wastes	Positive, long-term impact due to removal of asbestos-containing material and lead-based paint from existing facilities prior to demolition. No negative short- or long-term impacts to hazardous waste. No impacts to active Environmental Restoration Program or Military Munitions Response Program sites.	Impacts would be the same as for the Proposed Action, except that there would be a long term increase in the hazardous waste stream associated with new aircraft maintenance and industrial facilities.	No change.
Safety	Short-term increase in potential for accidents due to change in traffic and use of construction equipment.	Short-term increase in potential for accidents due to change in traffic and use of construction equipment. Long-term increase in the potential for more traffic accidents to occur as a result of the increase in population.	No change.
Infrastructure and Utilities	Long-term increase in potable water consumption, wastewater generation, and electricity and natural gas consumption from facility related usage. Short-term increase in potable water from dust suppression activities during demolition and construction. Short-term increase in solid waste generation from construction and demolition activities. No impact to drainage system capacity. Short-term increase in traffic counts during construction and demolition activities. Potential impacts to road conditions from continued heavy equipment traffic.	Impacts would be the same as for the Proposed Action, except that there would be an additional long-term increase in potable water consumption, wastewater generation, solid waste generation, traffic, and electrical and natural gas consumption from an increase in personnel.	No change.
Socioeconomic Resources	No change to population, housing or local school enrollment. Temporary increase in local expenditures due to construction and demolition activities.	Long-term increase in local population; however, the increase would fall within the projected growth rate for Bay County. Long-term increase in housing requirements on and off base. Increase in area school enrollment. It is expected that the school district would be able to support the increase in children associated with the Potential Development Alternative. Short- and long-term increase in local expenditures due to construction and demolition activities and increase population.	No change.
Environmental Justice	There are no minority or low-income populations present at Tyndall AFB or any United States Air Force installation. Because there are no such populations present on the installation, there is not an environmental justice community present that would be affected by the Proposed Action.	Impacts would be the same as for the Proposed Action.	No change.
Notes: NRHP = National Register of Historic Places SHPO = State Historic Preservation Officer WWII = World War II			

Table 2-9 Summary of Measures to Minimize Impacts

Resource	Mitigation and Best Management Practices
Airspace Use and Management	No mitigation measures are necessary. The Air Force would continue to publish and distribute Mid-Air Collision Avoidance guides to pilots containing information on preferred flight tracks, operational characteristics of high-performance military aircraft, and, points of contact to ascertain real-time status of Special Use Airspace.
Noise	Tyndall AFB tends to reduce adverse noise effects and annoyance in that very few flight operations and ground engine runs occur between 2200 hours and 0700 hours. Best Management Practices (BMPs) include restricting the operation of extremely noisy equipment (e.g., brick cutters or jackhammers) before 0900 hours and after 1700 hours. Other practices include utilizing properly operating and maintained equipment (e.g., possessing mufflers, gaskets, sharpened and lubricated blades), maximizing the distance of loud equipment from a residence, directing equipment to use less noise-sensitive routes, fitting silencers to combustion engines, fastening machinery covers or panels tightly, isolating vibrating parts and damping, constructing sound barriers to reduce propagation, or shutting off or idling machinery between work periods are other suggestions to reduce construction-associated noises and disturbances.
Land Use	Tyndall AFB tends to reduce adverse noise effects and annoyance in that very few flight operations and ground engine runs occur between 2200 hours and 0700 hours. After the aircraft operation increase, an updated AICUZ study would be prepared and updated noise contours and compatible land use planning recommendations would be furnished to the adjacent municipalities.
Air Quality	No mitigation measures are necessary. BMPs to minimize fugitive dust emissions would include watering the disturbed construction area, covering dirt and aggregate trucks and/or piles, preventing dirt carryover to paved roads, and using erosion barriers and wind breaks.
Earth Resources	No mitigation measures are necessary. Proposed construction projects would include site-specific sediment and erosion control plans that detail BMPs to prevent soil disturbance, capture and contain loose soil, and slow the movement of storm water during heavy rains. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, thereby reducing the total amount of soil exposed to wind.
Biological Resources	If the PDA were implemented, restoration and enhancement of vegetative communities to their historical state would continue to ensure suitable and diverse habitat for displaced wildlife. For all alternatives, a SWPPP should be implemented to reduce sediment runoff affecting habitat living in receiving waters.
Cultural Resources	Survey and evaluations of NRHP-eligibility prior to disturbance of archaeological resources. Eligible archaeological sites would require a mitigation plan in consultation with the SHPO and interested parties. SHPO concurrence with eligibility determinations prior to disturbance of archaeological resources or demolition of Cold War-era buildings. For construction in previously disturbed areas, Tyndall AFB should create contingency plans in the event of fortuitous finds or unexpected discoveries during construction activities. If ground disturbing activities occur in previously undisturbed areas, the areas should be subjected to a cultural resources survey.
Water Resources	No mitigation measures or BMPs are necessary for surface water, groundwater, or floodplains. Proposed construction projects would implement the base-wide and where necessary, site-specific SWPPPs. Installation of water saving devices in new construction would minimize impacts to surrounding communities who utilize surface water. Utilization of porous pavement and maintaining native plants with a deep root system would help to increase the amount of water infiltrated into the groundwater system. Proposed development activities should not structurally impair, reduce the flow of, or increase sediment loading of any on-site or adjacent waterbodies. Construction buffers should be maintained at all times and may include staked hay bales, staked filter cloth, and planting of native species. Use of fertilizers, pesticides, and herbicides should be avoided.
Hazardous Materials and Wastes	No mitigation measures are necessary. In the unlikely event groundwater was encountered, care would be taken during demolition and construction activities to ensure that groundwater resources are protected from contamination and that workers are protected from contaminated groundwater.
Safety	No mitigation measures are necessary. Construction contractors would develop and implement safety plans for each construction project.
Infrastructure and Utilities	No mitigation measures are necessary. Implementation of water and energy saving devices in new facilities and recycling of construction, demolition, and renovation wastes would help to offset utility consumption and solid waste generation.
Socioeconomic Resources	No mitigation measures or BMPs are necessary.
Environmental Justice	No mitigation measures or BMPs are necessary.
Notes: BMP = Best Management Practices	

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Chapter 3

Affected Environment

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the current conditions of the environmental resources, either manmade or natural, that would be affected by implementation of the Proposed Action or alternatives. Section 3.3 focuses on the conditions at Tyndall AFB and, where applicable, of the surrounding community. The baseline conditions presented in this chapter are described to the level of detail necessary to support analysis of potential impacts presented in Chapter 4, Environmental Consequences.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Tyndall AFB is located 13 miles east of the City of Panama City located in Bay County, Florida (Figure 1-1). The installation sits on a peninsula bisected by US Highway 98. The base is approximately 18 miles long and 3 miles wide and is surrounded by water to the north, west, and south. Tyndall AFB sits in the southeast corner of Bay County, encompassing approximately 29,000 acres.

Tyndall Field was opened in 1941 as a gunnery school to support World War II (WWII) and then later became the home of the Air University's Air Tactical School. This school served to train junior officers in the responsibility of command at the squadron level. The installation was renamed Tyndall AFB in 1947. In the 1950's, the base trained all-weather jet interceptor pilots and air weapons controllers at the newly designated US Air Force Pilot Instrument School and the base's primary mission became that of a weapons employment center. In 1979, Tyndall was transferred to the Tactical Air Command, beginning its mission to help defend southeastern United States. In 1981, F-101, F-106, and T-33 aircraft were utilized at the installation to support the mission of the 325th Fighter Weapons Wing, which later became the 325th Tactical Training Wing and gained responsibility for all F-15 maintenance, training, and pilot training for Tactical Air Command. MU-2 aircraft also arrived at Tyndall AFB in the 1980's. In the 1990's the 325th Tactical Training Wing became the 325 FW and in 2003, Tyndall AFB was selected to host the F-22 Pilot Training mission. The current primary mission activity at Tyndall AFB is the training and evaluation of personnel and weapons.

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 Airspace Use and Management

3.3.1.1 Definition of Resources

Airspace use and management address how and in what airspace the aircraft operating at Tyndall AFB would fly. This section of the EA examines the rules, regulations, and procedures to permit the military aircraft to operate safely among all aircraft in the National Airspace System. Airspace management and use is interrelated to other resources and topics including, but not limited to: safety, land use, noise, air quality, and biological resources.

3.3.1.2 Characteristics of Airspace

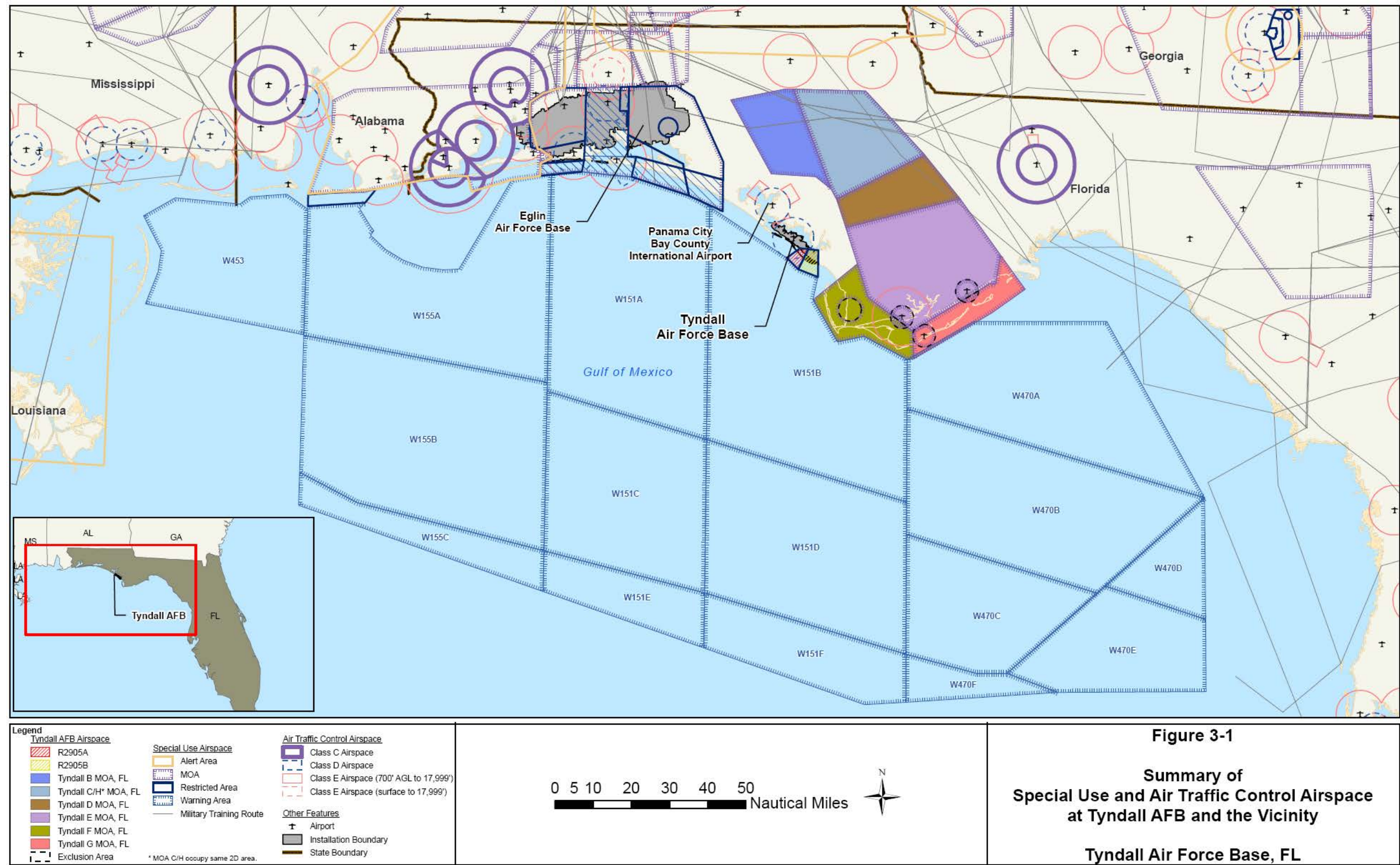
The Federal Aviation Administration (FAA) has primary jurisdiction over the management of airspace. They classify airspace based upon whether it provides Air Traffic Control (ATC) separation within it or not—controlled versus uncontrolled airspace. In addition, the FAA designates SUA when it removes a volume of airspace from the public domain, excluding other users and allocating it for the benefit of a particular category of user, such as the military. Figure 3-1 provides an overview of the SUA and ATC airspace at Tyndall AFB and the vicinity.

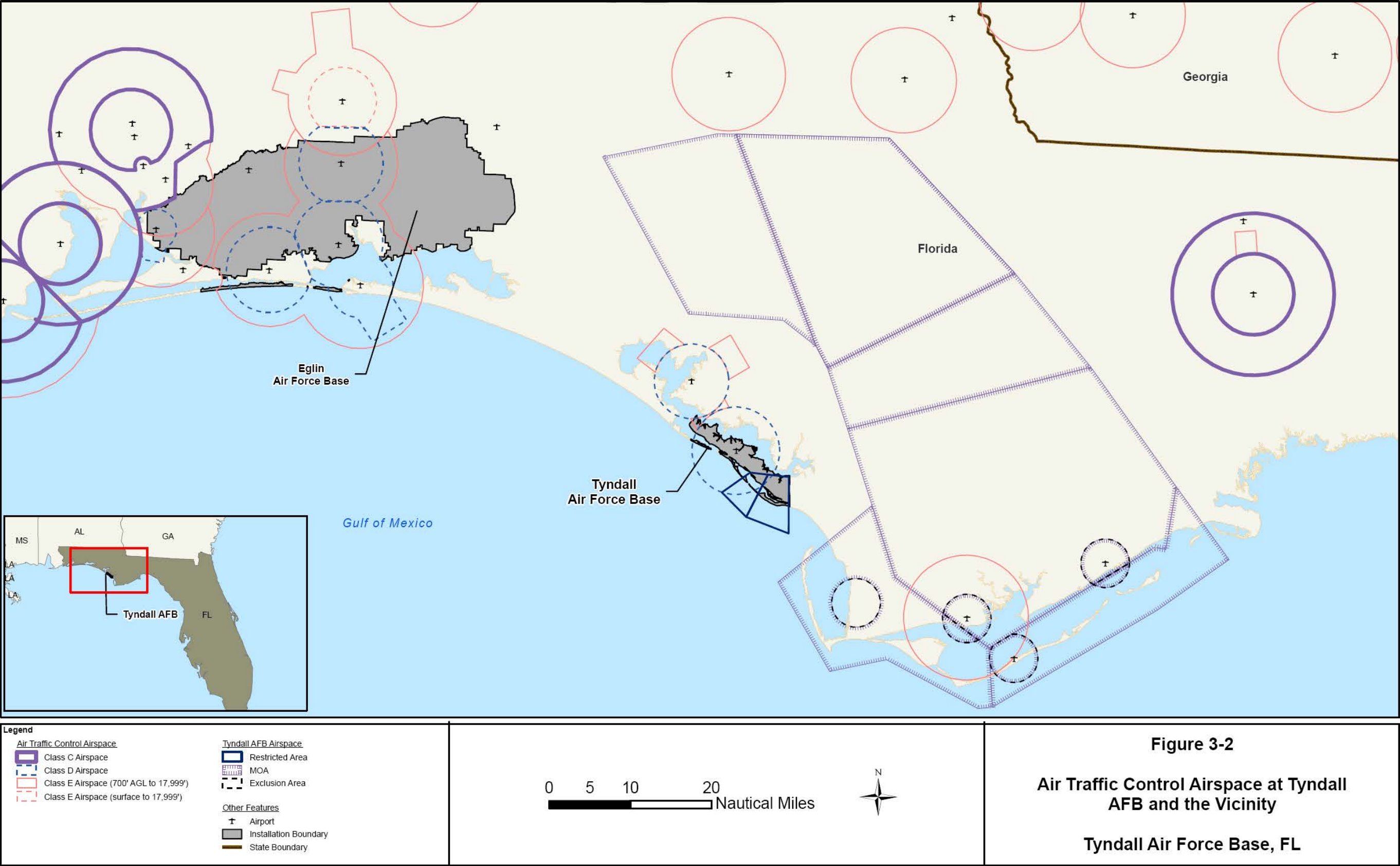
3.3.1.2.1 Controlled Airspace

Controlled airspace, in Figure 3-2 for Tyndall AFB and the vicinity, is airspace of a defined, particular geographic dimension within which the FAA may exercise ATC and provide separation services to certain, participating aircraft. It is a generic term encompassing five classifications that correlate to the level of service provided, and degree of regulation imposed (i.e., whether receipt of ATC service and compliance with ATC clearances is mandatory or voluntary). Among the classifications, there are varying levels of minimum weather requirements (in-flight visibility and cloud ceiling heights), minimum airmen certification ratings, required aircraft equipment, and required communications. Most airspace higher than 1,200 feet above the ground level (AGL) is controlled airspace and in the vicinity of busier airports, controlled airspace extends all the way to the surface. For example, the airspace immediately surrounding and over Tyndall AFB is Class D airspace. A control tower and a radar approach/departure control facility provide certain aircraft separation services. Pilots must establish two-way radio communications with ATC when operating within this class of airspace. Above Class D airspace is Class E airspace, from surface to 17,999 mean seal level (MSL). This airspace represents the least restricted end of the controlled airspace continuum; only aircraft operating under instrument flight rules (IFR) must obtain an ATC clearance and the separation provided is only from other IFR traffic. From 18,000 MSL upward, the airspace is classified as Class A. Within this airspace all aircraft must operate under IFR and on an ATC clearance. Positive control of all aircraft movement is therefore exercised by ATC and all aircraft are separated from each other.

3.3.1.2.2 Uncontrolled Airspace

Uncontrolled airspace also has a particular geographic dimension. Unlike controlled airspace, its metes and bounds are not published; rather, it is what remains of the entire navigable airspace in those areas where controlled airspace has not been designated. The FAA may not provide separation service within uncontrolled airspace and correspondingly the minimum required weather, airman certification ratings, equipment, and communications are the least restrictive. This airspace exists at the surface of the earth in rural areas and many smaller general aviation and military airfields lie within uncontrolled airspace. No particular clearance or communications requirement exist for operations within uncontrolled airspace. The FAA has designated only one type of uncontrolled airspace, Class G.





3.3.1.2.3 Special Use Airspace

Special Use Airspace (SUA), shown in Figure 3-3 for Tyndall AFB and the vicinity, is a generic term for airspace that has a particular geographic dimension that has been designated either to contain particular hazardous activities or to exclude non-participating aircraft, or both.

Unlike airspace within which separation services are provided (i.e., controlled versus uncontrolled), SUA is established for a different purpose: to disclose to pilots that activities (e.g. artillery ranges) or flight operations (usually military) are occurring within a particular geography and restrict to varying degrees flight operations by aircraft not participating in those activities. SUA is also established to protect high-value assets of national significance on the ground.

Restricted (R-) Areas and Military Operations Areas (MOAs) are two examples of SUA. The geographic limits of a given SUA do not correlate to whether airspace is controlled or uncontrolled. Within a MOA, non-participating IFR traffic is rerouted around the MOA for those periods that the airspace is active. Traffic operating under visual flight rules (VFR) is not restricted; however, MOAs are charted and pilots are strongly encouraged to avoid active MOAs because the activities occurring therein (acrobatics, formation flights, etc.) do not mix well with civilian air traffic. Within R-Areas, the activities are hazardous to any non-participating traffic and therefore that traffic is not permitted entry during those times the R-Area is active. A third type of SUA found along coastal waters is a Warning (W-) Area. A W-Area is established over international waters to provide disclosure to non-participating traffic. However, as the jurisdiction of the United States to regulate airspace does not extend over international waters, a W-Area that would otherwise be established may not be. The level of hazard to non-participating users is the same.

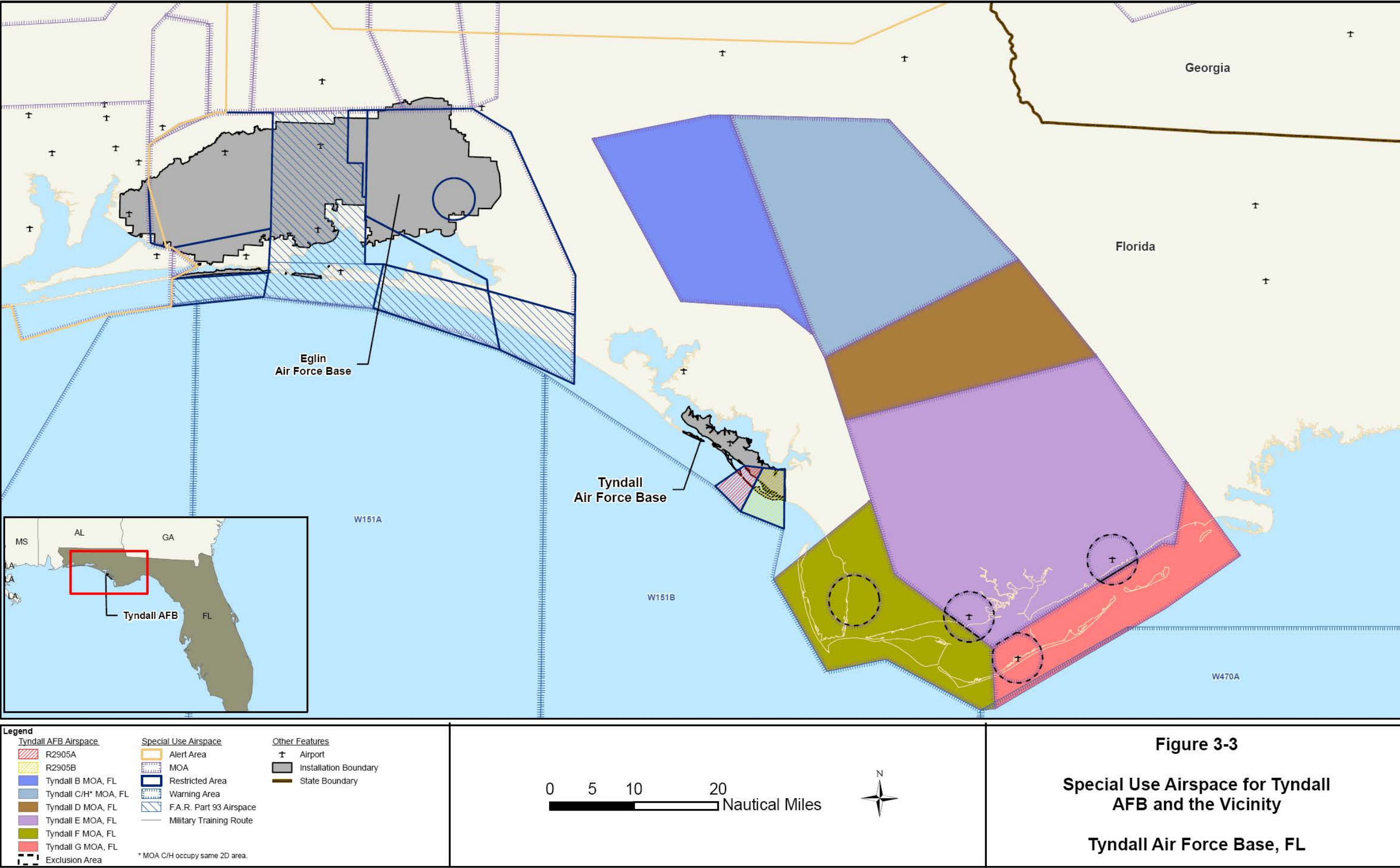
3.3.1.3 Region of Influence

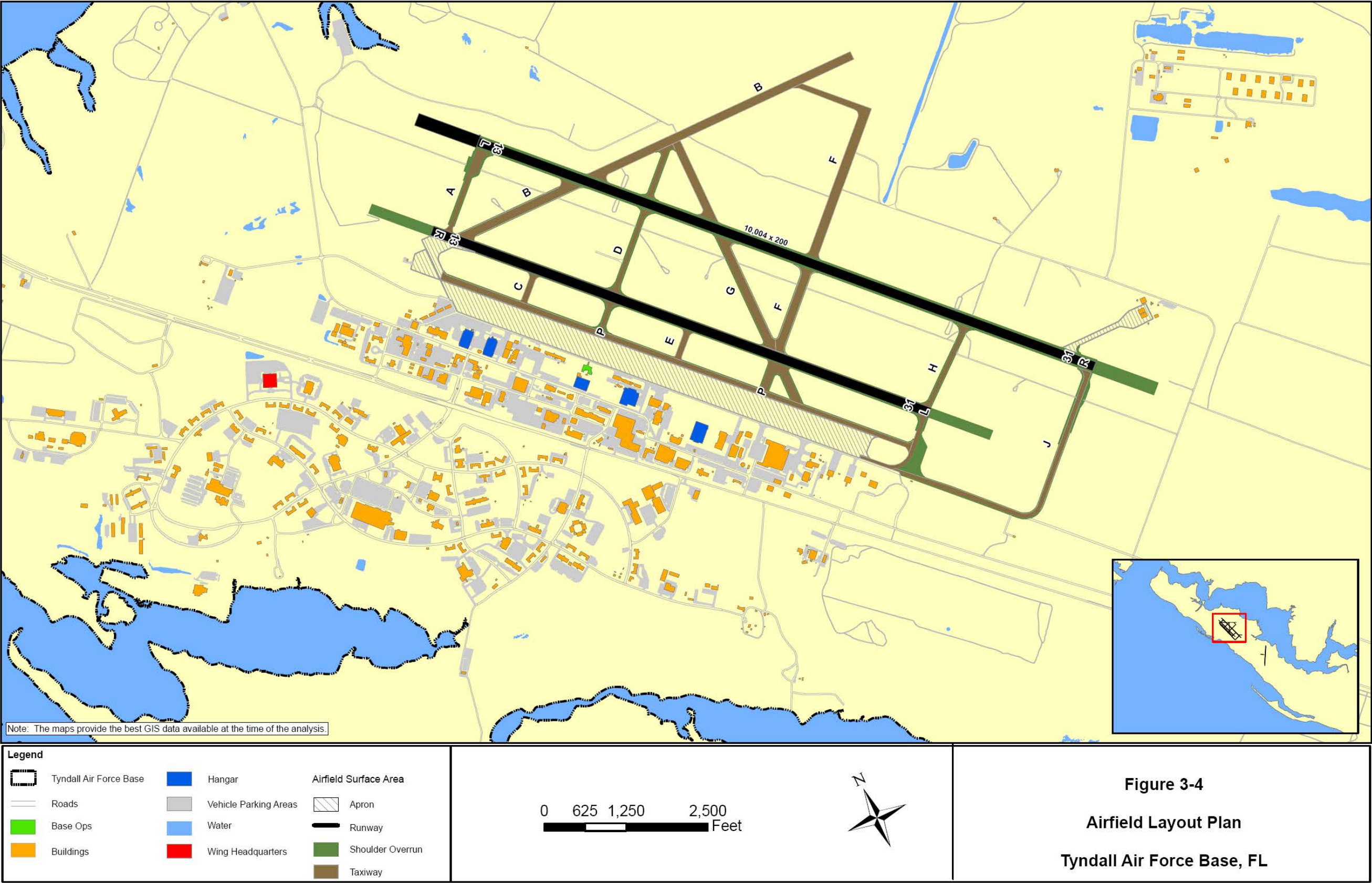
The Region of Influence (ROI) for airspace includes Tyndall AFB and the vicinity, as well as the military training airspace within which the military aircraft stationed there regularly fly. This airspace includes the area around Tyndall AFB and SUA associated with and scheduled by the 325 FW. The Proposed Action involves aircraft operations in both a Class D terminal airspace setting and in training airspace. The Tyndall AFB Class D airspace extends outward on a 5.4-nautical mile (NM) radius from the airfield. The training airspace extends outward over both land and water approximately 150 NM. With respect to ATC airspace, the ROI for this action is the area that generally is within 20 miles of the airfield. With respect to training airspace or SUA, the ROI is generally within 150 NM of Tyndall AFB.

3.3.1.4 Tyndall AFB and Vicinity

Figure 3-4 depicts the airfield at Tyndall AFB and Figure 3-1 shows the airspace and airports along the Gulf Coast and Florida Panhandle. Tyndall AFB is the primary airport for which the Class D airspace was created.

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A significant airport with commercial air carrier service is Panama City Bay County International Airport, located approximately 10 NM northwest of Tyndall AFB. Tyndall AFB lies on the eastern side of a Gulf Coast region with extensive military and civilian air traffic. From New Orleans on the western end to Tampa on the eastern end, the Gulf Coast region has an unusual concentration of military, air carrier, and general aviation airports. Coupled with the considerable SUA assets used by the military, it is a complex airspace setting. In addition to Tyndall AFB and Panama City International Airport, other significant military airfields (Eglin AFB, Naval Air Station Pensacola), air carrier (Tallahassee Regional), and numerous private airfields with paved and unpaved runways exist in the region (FAA 2008a). Table 3-1 presents selected military and public use airfield data.

Table 3-1 Selected Public Use and Military Airports within the ROI for Tyndall AFB

Name	ID	Surface Airspace	2007 Operations Count	Distance from Tyndall AFB	IFR Approach Type	Longest Runway (feet)
Tyndall AFB	KPAM	Class D	114,311	N/A	Precision	10,004
Panama City Bay County International	KPFN	Class D and Class E	84,445	10 NM Northwest	Precision	6,308
Apalachicola Regional	KAAF	Class G	24,375	35 NM Southeast	Non-precision	5,271
Destin-Ft Walton Beach	KDST	Class D and Part 93 Special Air Traffic Rules	63,000	50 NM Northwest	Non-precision	4,999
Eglin AFB	KVPS	Class D/E and Part 93 Special Air Traffic Rules	126,060	55 NM Northwest	Precision	12,005
Tri-County Airport	1J0	Class G	28,376	54 NM East	Non-Precision	4,000
Tallahassee Regional Airport	KTLH	Class C	99,582	74 NM Northeast	Precision	8,000
NAS Pensacola (Forest Sherman Field)	KNPA	Class C	Not Reported	92 NM West	Precision	8,002
Source: FAA 2008a, FAA 2008b, and USAF 2007a						

The airfield at Tyndall AFB, while busy at 114,311 annual operations, would not be viewed as busy compared to the major air carrier airports in the country in terms of its annual aircraft operations counts. For comparison, the 35th busiest airport in 2007 was Pittsburgh International with 212,998 operations.

The airfield at Tyndall AFB consists of two parallel runways, spaced relatively close together (Figure 3-4). Runway 13R/31L is the innermost or inside runway (with respect to the aircraft parking ramps and hangars). Runway 13L/31R is the primary runway, to which transient aircraft and instrument arrivals occur. Accordingly, a variety of aircraft types use this runway and during periods of less favorable weather conditions, it becomes the preferred runway.

Runway 13L/31R is longer than the inner runway. Both runways are configured with the requisite safety equipment and cabling for high performance aircraft operations. However, the inside runway (13R/31L) does not have any ground-based navigation transmitters that would

provide the course guidance to allow separate precision instrument approaches. The runways are each 150 feet wide and from centerline to centerline the distance separating them is 1,525 feet.

The Tyndall Class D airspace is designed to accommodate the military training mission performed by the 325 FW. The Class D airspace extends upward from the surface to, and including, 2,500 feet above MSL and extends outward 5.4 NM radius from the airport center reference point (Figure 3-2).

Northwest of Tyndall AFB is the Panama City Bay County International Airport. This airfield is the commercial air carrier airport for the Panama City area. It has an FAA ATC tower with Class D airspace extending upward from the surface to 2,500 feet MSL within a 4.6 mile radius around the airport. The Tyndall AFB Radar Approach Control (RAPCON) provides sequencing services to participating VFR aircraft and arrival and departure control services (aircraft separation) to IFR aircraft for both airports.

3.3.1.5 Military Training Airspace

The 325 FW aircraft primarily use the Tyndall MOAs when executing their training syllabus. The Tyndall B MOA lies 16 NM northwest from Tyndall AFB and extends outward 40 NM. Its floor is 9,000 MSL and it extends to the floor of the overlying Class A airspace at 18,000 MSL. The Tyndall C, H and D MOAs lie 16 NM north-northeast of the airfield and extend outward 45 NM. The floor of the Tyndall C and Tyndall D MOAs are 300 feet AGL and they extend up to 6,000 MSL. The Tyndall H MOA, which has the same geographical coordinates as Tyndall C MOA, begins at 9,000 feet MSL and extends to the floor of the overlying Class A airspace at 18,000 MSL. The Tyndall E and F MOAs lay 14 NM east-southeast from Tyndall AFB. Their floors are 300 feet AGL and extend to the floor of the overlying Class A airspace at 18,000 MSL. Other charted SUA airspace in the Panama City metropolitan area includes two R-Areas adjacent to the Tyndall AFB Class D Airspace (Figure 3-2).

In addition to the previously mentioned MOAs and R-Areas, additional SUA overwater (Warning Areas managed by Eglin AFB) are available for use by the 325 FW.

3.3.2 Noise

3.3.2.1 Definition of Resource

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities, such as communication or sleep. A human's reaction to noise varies according to the duration, type, and characteristics of the source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. To quantify noise and describe its effects on the natural and human environment, a basic description of sound terminology is presented.

Sound is a series of vibrations (energy) transmitted through a medium (such as air or water) that are perceived by a receiver (e.g., humans). It is measured by accounting for the energy level represented by the amplitude (volume) and frequency (pitch) of those vibrations and comparing that to a baseline standard. As a sound wave moves through the atmosphere, a temporary

increase in pressure occurs; it is the atmospheric pressure change that is detected as sound. The magnitude of the pressure change is the loudness and the frequency of the temporary changes is the pitch. The human ear can detect pressure differences over a wide range of sensitivities. For example, a whisper heard two meters away creates a pressure change from standard atmospheric pressure of approximately 0.0006 Pascals, whereas an M16 rifle at the firer's ear creates a change of 1,000 Pascals. Although one event represents 1,666,666 times more energy than the other, both represent sounds that can be heard by a human ear. A method for readily comparing these vast pressure differences is to describe them in exponential rather than linear terms. This simplifies the units and more closely depicts the way humans actually perceive sound levels. The decibel (dB) is a logarithmic ratio of the increase in atmospheric pressure a sound event causes compared to a defined reference pressure, which happens to be the lowest detectible pressure recognized by the human ear (0.00002 Pascals). When using decibels to depict airborne sound pressure levels (SPLs), zero dB is the threshold of human hearing and exponential increases occur every ten dB. An event that generates 60 dB of sound is ten times louder than one that generates 50 dB. In the example above, the whisper (0.0006 Pascals) translates to 29 dB and the M16 rifle shot (1,000 Pascals) is 153 dB.

The SPL represented by a given decibel value is usually adjusted to make it more relevant to sounds that the human ear hears especially well; for example, an "A-weighted" decibel (dBA) is derived by emphasizing mid-range frequencies to which the human ear responds especially well and de-emphasizing the lower and higher range frequencies. In addition to weighting based on frequency, sound levels are further differentiated by factoring in the effect of time since sound levels normally vary in intensity and are not continuous.

The building block of noise metrics used in describing aircraft noise is the A-Weighted Sound Level. It simply describes in terms of A-Weighted dB a sound pressure level at any given moment in time. From this building block, several other metrics are derived.

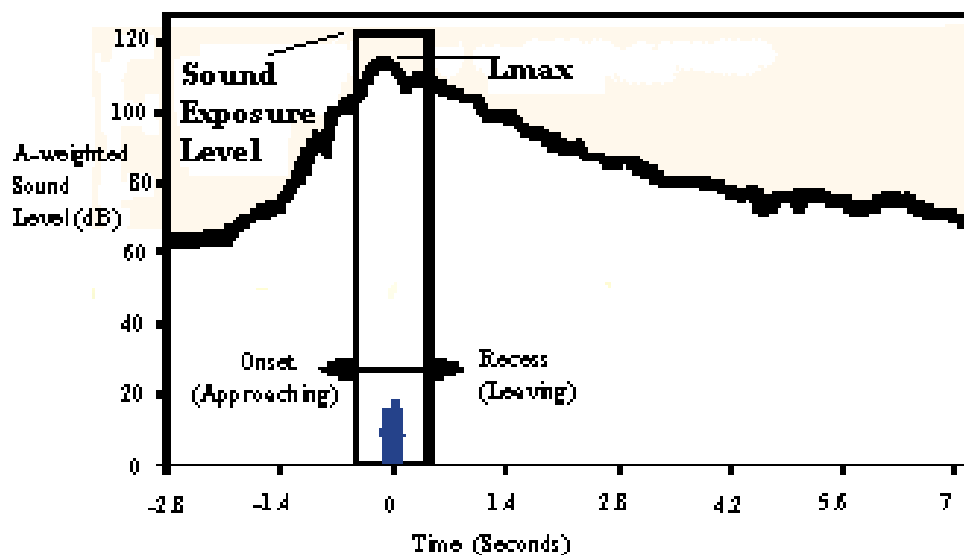
The *Maximum Sound Level* ($L_{\max}$) is the peak value of all the *A-Weighted Sound Levels* that occurs during a noise event. The limitation of this metric for noise (annoyance) analysis is that peak sound level without a context of duration or time of day does not adequately address annoyance. For example most would agree that a single 140 dB $L_{\max}$ event lasting three seconds (i.e. an aircraft flyover) that occurs once per day around 1300 hours is less annoying than a 95 dB $L_{\max}$ event (a jackhammer in a construction site) that lasts for 6 hours, every day and occurs at 2300 hours.

The *Equivalent Sound Level* (L_{eq}) reflects the average continuous sound. It is a metric that takes into account both intensity of an event and duration. The metric considers variations in sound magnitude over periods of time, sums them, and reflects, in a single value, the acoustic energy present during a specified time period. Common time periods for averaging are 1, 8, and 24-hour periods.

The *Sound Exposure Level* (SEL) is a specific type of L_{eq} that describes a receiver's cumulative exposure over the course of an event and compresses that energy into a one-second period (Figure 3-4). For noise events whose duration is greater than one second, the SEL will be greater than the $L_{\max}$. Conversely events with durations shorter than one second the SEL will be less than the $L_{\max}$. SEL is a very useful metric for predicting

short term activity interruption or reaction by wildlife to a noise stimulus. It is used to allow direct comparison of events having varying intensities and durations, such as an aircraft overflight, by calculating SELs of those events. The fact that SEL is a cumulative metric means that louder events have greater SELs than do quieter events and longer events have greater SELs than do shorter events.

Figure 3-5 Single Noise Event Showing SEL and L_{max}



Source: USAF 2000

SELs vary according to the aircraft and engine type, engine power setting, aircraft speed, and slant distance, i.e. the distance between the aircraft and the observer. It is a very useful metric for prediction of activity interruption in humans and varied physiological responses in wildlife. Use of SEL allows direct comparison between sounds with varying levels and durations by converting them to exposure levels. Table 3-2 contains SELs for aircraft at typical takeoff speeds and power settings at various altitudes directly above the listener.

Table 3-2 Sound Exposure Levels dBA^a

Aircraft	Speed (knots)	Power	100 Ft AGL (dBA)	500 Ft AGL (dBA)	1,000 Ft AGL (dBA)	5,000 Ft. AGL (dBA)
F-15	170 kts	90% NF	126.4	121.3	115.9	100.4
F-22	160 kts	100% ETR	138.0	126.9	121.4	105.8
Notes: % = percent AGL = Above Ground Level dBA = "A-weighted" decibel Ft = feet NC = % of maximum rated RPM measured at core NF = % at maximum rated RPM measured at Fan blades ETR = Engine Thrust Request RPM = revolutions per minute ^a Sound levels calculated using SELCALC software; speed and power settings used are typical for takeoff for each aircraft type.						

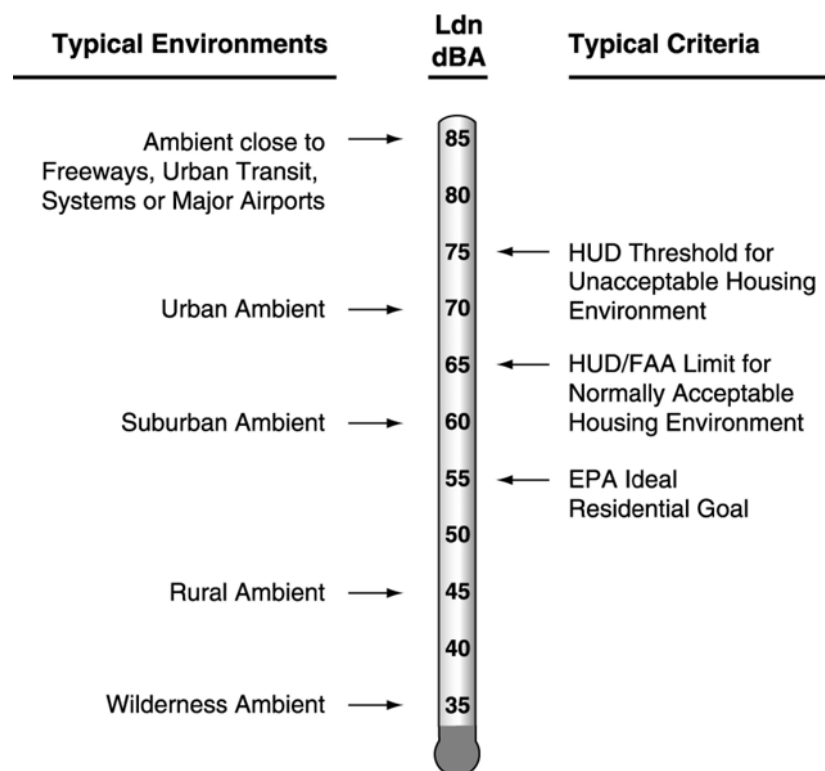
While the above metrics are useful at describing instantaneous, peak or even comparative noise events, they do not account for multiple event occurrences, the diminution of background noise during nighttime periods, or the increased annoyance expressed with events that occur during nighttime periods when many people are sleeping. Therefore, an additional metric that accounts for cumulative (or repetitive) exposure, time of day, intensity and duration is used.

The *Day-Night Average Sound Level* (DNL) describes a receiver's cumulative noise exposure from all events occurring during a 24-hour period; events occurring between 2200 hours and 0700 hours ("environmental night") are increased by ten dB to account for greater nighttime sensitivity to noise events. If there were no noise events occurring during the nighttime period, DNL and $L_{eq(24)}$ would be equal.

Because of the logarithmic nature of the decibel, this means that a single nighttime event creates the same DNL as ten identical events during the day. The DNL is used in this assessment when describing noise from aircraft. For temporary, intermittent noise events the L_{max} or SEL is a more useful metric and they are used for assessing the effect to the noise environment from operation of construction equipment and similar activities.

The use of these noise metrics is chosen based on federal guidelines developed in order to be able to quantify noise and the reaction of those exposed to it in a community in a sound, objective, and scientifically valid fashion. The federal government established a working group to review the science of noise and recommend standards for its agencies to use when assessing the effects from noise. The Federal Interagency Committee on Noise (FICON) reviewed the existing science on the subject of urban, industrial, and aircraft noise, land use compatibility, and health and human safety and validated the use of DNL as the appropriate metric for describing noise from aircraft operations and assessing its effects. The DoD uses DNL as its common metric to describe noise exposure when describing and assessing noise from aircraft overflights, range operations, and other similar discontinuous but repetitive occurrences. Within the DoD, the AICUZ program that assesses noise related specifically to aircraft and range operations has been developed and adopted by its services, including the Air Force (DoD 1977). AICUZ studies assess predicted noise exposure in terms of DNL. The DNL metric has also been adopted by the US Department of Housing and Urban Development (HUD), the FAA, and the United States Environmental Protection Agency (USEPA) as a common standard for assessing noise levels for compatibility with land uses, health and human safety, and effects on wildlife (See Figure 3-6).

Figure 3-6 Typical DNL Values and Goals/Criteria for Outdoor Environments



The DoD AICUZ program outlines compatible land uses by first predicting noise exposure zones or contours depicting lines of equal noise exposure that would result from normal operations at a particular place, and then by recommending land uses that are ordinarily considered compatible with the predicted noise exposure level for those locations contained within the noise contours (DoD 1977 and USAF 1999). In addition to assessing land use compatibility from the perspective of noise, the DoD AICUZ program assesses accident potential and outlines compatible uses in those areas nearest to the runway ends.

The Air Force AICUZ program is that service's implementation of the DoD directive to assess and disclose noise created by operations on an installation with the goal of preventing the encroachment of incompatible uses on the surrounding areas in a way that ultimately compromises the viability of the installation. The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing four bands of noise exposure: (1) 65 to 69 dBA DNL; (2) 70 to 74 dBA DNL; (3) 75 to 79 dBA DNL; and (4) 80 dBA DNL or more (DoD 1977 and USAF 1998). Within these bands of noise exposure, certain land uses are considered acceptable or unacceptable. For example, residential uses are normally not considered compatible with a predicted noise exposure in excess of 65 DNL and an office use is not considered compatible in an area having a predicted noise exposure greater than 80 DNL (FICUN 1980).

Specific noise exposure contours are developed for each Air Force installation that has flying activities; these contours are released to the surrounding jurisdictions to guide their land use planning or are used to guide facilities planning on Air Force bases. Areas below the 65 dBA

DNL are typically categorized as compatible for residential use. The Air Force's policy has been to implement, if feasible, noise level reduction (NLR) measures for on-base residential and public use buildings with all new buildings being designed and constructed to comply with the appropriate NLR standards (USAF 1978).

Apart from noise associated with the operation of aircraft, federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Occupational safety and health regulations are a primary method of enforcing these guidelines and standards.

Hearing Loss. The potential for permanent hearing loss arises from direct exposure to noise on a regular, continuing long-term basis (16 hours a day for 40 years) to levels above 75 DNL. Based on an USEPA report (USEPA 1974), hearing loss is not expected in people exposed to 75 DNL or less. The Federal Interagency Committee on Urban Noise states that hearing loss due to noise: 1) may begin to occur in people exposed to long-term noise at or above 75 DNL; 2) would not likely occur in people exposed to noise between 70 and 75 DNL; and 3) would not occur in people exposed to noise less than 70 DNL (FICUN 1980).

Noise Interference. Elevated noise levels can potentially interfere with speech, cause annoyance, or disturb sleep. Annoyance resulting from noise exposure is typically measured via community surveys where the level of tolerance can vary greatly among individuals (USEPA 1974). It is estimated that 13.5 percent of the population exposed to 65 DNL would be highly annoyed, while 37 percent would be highly annoyed if exposed to a 75 DNL (USEPA 1974). Research also indicates that the "type of neighborhood" a person inhabits influences their noise annoyance level, with instances of noise complaints being greater for those living in rural areas than in suburban or urban residential areas (Schomer 2001).

Interior noise levels are typically lower than exterior levels due to the attenuation of the sound energy by the structure, with the amount of noise level reduction provided by a building depending on the type of construction and the number of openings such as doors, windows, chimneys, and plumbing vents. The approximate reduction in interior noise is 15 dBA when windows are open and 25 dBA for closed windows (USEPA 1974).

Region of Influence. The region of influence for a noise assessment is a function of the type of action proposed. For the Proposed Action and its alternatives, the region of influence would primarily be the military installation itself and areas extending approximately 5 to 7 miles into the surrounding jurisdictions of the city of Panama City and Bay County, Florida.

3.3.2.2 Affected Environment

The noise environment at Tyndall AFB primarily consists of noise created from aircraft operations. This noise setting was described in detail in the installation's March 2007 AICUZ report (USAF 2007a). In preparation for this document, the aircraft operations data were updated and modeled in 2008. Other sources of noise include vehicle noise, routine operation of equipment and machinery (e.g., generators; heating, ventilation, and air conditioning), and operation of construction equipment. The effects associated with the presence of noise at Tyndall

AFB are examined in light of their effects on land use compatibility and human health and safety.

Aircraft Noise. The bulk of aircraft operations at Tyndall AFB are conducted by the 325 FW, the installation host unit. The Air Force has extensively studied the aircraft noise environment at Tyndall AFB, preparing an analysis in 2000 and updating it 2007. The 2007 updated data and report detail the mix of aircraft types and operations conducted at Tyndall AFB during an average busy day. Training flights with jet engine fighters (F-15 *Eagle*, F-22 *Raptor*) and turbo-propeller trainers (MU-2 *Marquise*), as well as the Tyndall Aero Club (a Morale, Welfare and Recreational activity) account for the based aircraft operations. In addition, a small number of transient aircraft stationed elsewhere use the airfield; however, these aircraft comprise less than three percent of all operations. The 2007 data update indicates that the average annual operations count of all aircraft at Tyndall AFB is approximately 114,000 (USAF 2007a).

The resultant predicted baseline noise exposure of 114,000 annual aircraft operations for the mix of aircraft found at Tyndall AFB is shown as a set of noise contours that are centered about the runways. Figure 3-6 depicts the predicted baseline noise exposure in the general vicinity of Tyndall AFB. Table 3-3 details the acreage lying within each noise contour.

**Table 3-3 Land Area Exposed to Elevated Noise Levels
(Total and Off-Base – Excluding Water)**

Noise Level DNL	Baseline: Total Land Area (In Acres)	Baseline Land Area (Off-Base – Excluding Water)
65 to 69	29,676	303
70 to 74	14,221	153
75 to 80	6,641	0
>80	4,187	0
Total	54,725	456
Source: USAF 2007a		

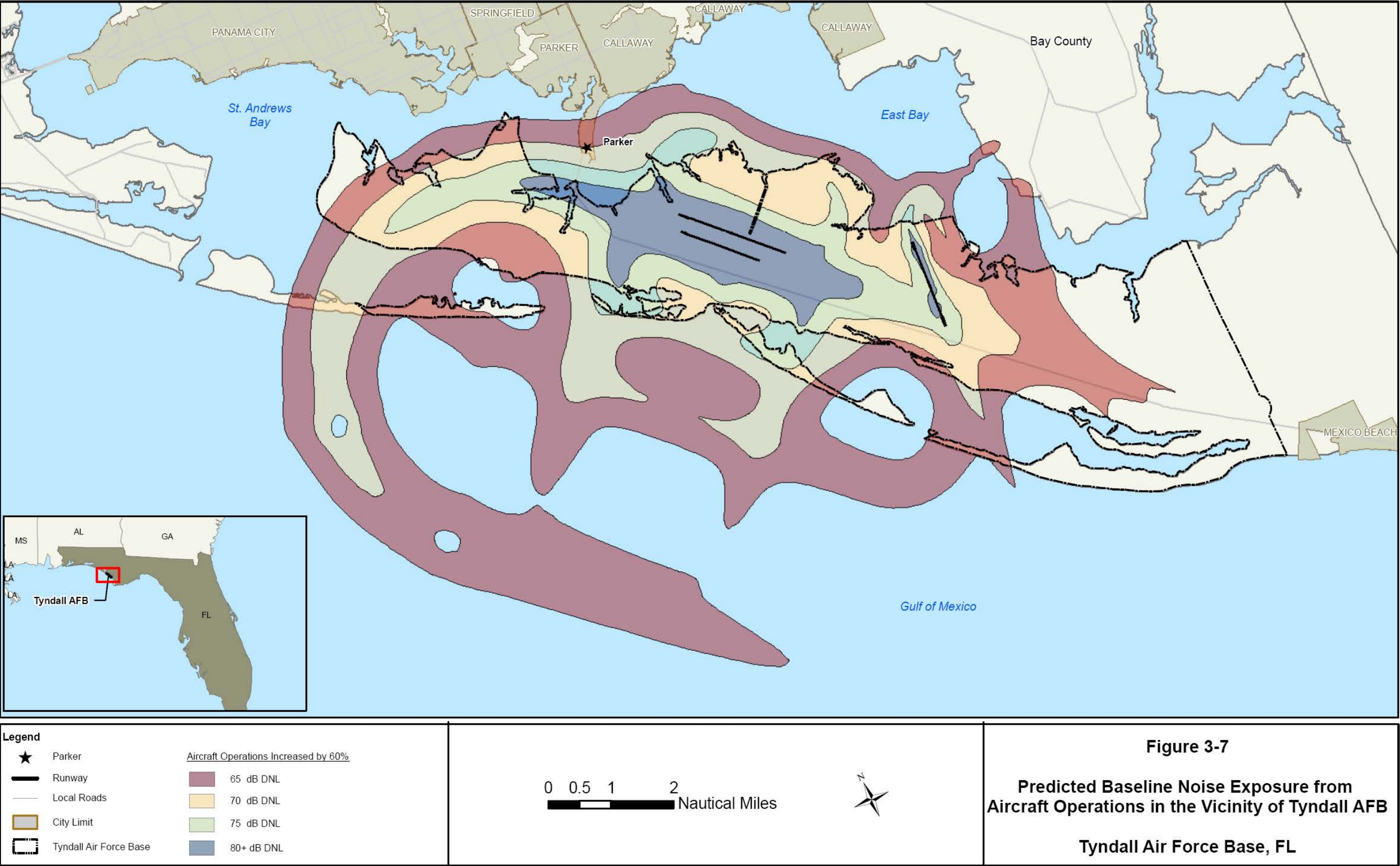
Construction Noise. Noise associated with the operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The loudest machinery generally produces peak SPLs ranging from 86 to 95 dBA at 50 feet from the source (Table 3-4). For every multiple of this distance, SPL decreases by 6 dBA. It is important to note that the peak SPL range for construction equipment noise does not take into account the ability of sound to be reflected/absorbed by nearby objects, which would further reduce noise levels. Additionally, interior noise levels would be reduced by 18 to 27 dBA due to the NLR properties of the building's construction materials (FAA 1992).

Table 3-4 Peak Sound Pressure Level of Heavy Equipment from a Distance of 50 Feet

Equipment	Noise Generated ⁽¹⁾
Bulldozer	95 dBA
Scraper	94 dBA
Front Loader	94 dBA
Backhoe	92 dBA
Grader	91 dBA
Crane	86 dBA
Source: Reagan and Grant 1977	
Notes:	
dBA = A-weighted decibel	
⁽¹⁾ Noise from a single source	

The DNL that would result from operating construction equipment is a function of the frequency, duration, and time of day during which the activity occurs. For example, a bulldozer that generates 95 dBA at 50 feet and is operating continuously for 365 days from 0600 hours to 2200 hours for an entire year would be operating during all 15 “day” hours and one “night” hour of the DNL metric. Absent other sources of noise (e.g., aircraft operations), such operation would create a predicted noise exposure of 64 DNL.

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3.3.3 Land Use

3.3.3.1 Definition of Resource

Land use describes the activities that take place in a particular area and generally refers to human modification of land, often for residential or economic purposes. It also refers to use of land for preservation or protection of natural resources. It is important as a means to determine if there is sufficient area for proposed activities and to identify any potential conflicts with local land use plans. This section of the EA describes the on- and off-base land use resources that could potentially be affected by the implementation of the proposed or alternative actions.

3.3.3.2 Region of Influence

The ROI consists of Tyndall AFB and the vicinity. Off-base resources consist of lands and waterways immediately adjacent to Tyndall AFB and include areas belonging to Panama City and Bay County. The ROI also includes the land under the airspace where the F-15 *Eagle*, the F-22 *Raptor*, and the other aircraft stationed or performing temporary duty at Tyndall AFB. It also includes the SUA, the Tyndall B, C/H, D, E, F, and G MOAs along with the Warning Areas off the Gulf Coast managed by Eglin AFB.

3.3.3.3 Tyndall AFB and Vicinity

Tyndall AFB is located on 28,460 acres in the Gulf Coast Region of northwest Florida (USAF 2004). It lies 13 miles southeast of Panama City in the southeast corner of Bay County. The base is on an 18-mile long, 3-mile wide peninsula extending northwestward from the Florida mainland and Panama City sits across Saint (St.) Andrews Sound to the northwest (Figure 1-1). The community of Parker is located north of Tyndall AFB on the mainland, across East Bay and connected to the base by a bridge carrying US Highway 98. The installation's location along the Gulf Coast offers military pilots wide open spaces and large unconstrained blocks of airspace within which they may perform their test and training missions. This, combined with favorable weather of the region, provides an outstanding location to conduct aircraft operations.

3.3.3.4 Air Installation Compatible Use Zone Program

The Air Force provides land use recommendations to local jurisdictions through the AICUZ program. The purpose of the program is to promote compatible land use development in areas subject to aircraft noise and accident potential. These guidelines have been established on the basis of studies prepared and sponsored by several federal agencies, including the DoD. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The AICUZ study is updated periodically per AF1 32-7063. According to the last published AICUZ study for Tyndall AFB, there are very few encroachments from incompatible uses in the vicinity of Tyndall AFB (USAF 2008a). Noise contours from aircraft operations, depicting lines of equal predicted noise exposure levels, extend parallel and from the ends of the runways over Tyndall AFB and the surrounding waters. The contours curve southward away from land and over the Gulf Coast. Refer to Figure 3-6 for a graphical representation of the noise contours for Tyndall AFB. The majority of the off-base

land under the noise contours is either on-base lands expected to remain as open space or in the domain of the federal government, or water. All of the clear zones for Tyndall AFB overlie government property or water. Accident Potential Zones (APZs) I and II extend off base to northwest and southeast for Runway 13L/31R and 13/R/31L. The APZs extend off base to the north and south for Runway 18/36. The specific noise exposure levels from aircraft operations in the vicinity of Tyndall AFB were most recently released to local governments for their use in planning documents with the release of the Tyndall AICUZ study in 2008 (USAF 2008a). Additional, specific information on the noise environment around Tyndall AFB may be found in this document in Section 3.3.2.

3.3.3.5 Land Use Planning on Tyndall AFB

Tyndall AFB most recently updated its General Plan, including its land use and capital improvement recommendations in 2004. In doing so, it inventoried existing land uses and noted linkages between land use classifications and also noted potential conflicting land uses. The majority of acreage on Tyndall AFB is devoted to open space, accounting for over 60 percent of the installation. Airfield uses, industrial uses, and recreational uses each account for approximately 8 to 9 percent of the installation acreage (Table 3-5). The relationship of land use classifications is shown in Figure 3-8 and land use patterns at Tyndall AFB are shown in Figure 3-9.

Table 3-5 Tyndall AFB 2004 Current Land-use Plan

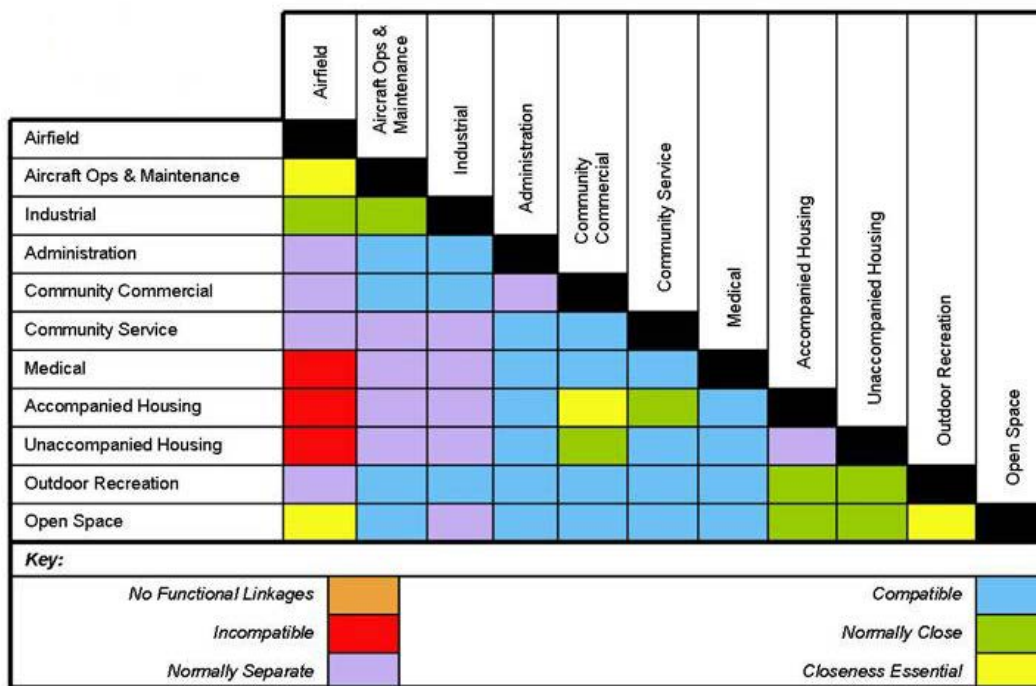
Land-use Category	Area (Acres)	Percent of Total Land
Administrative	111.7	0.4
Airfield	2,529.6	8.9
Aircraft Operations and Maintenance	152.5	0.5
Community Commercial	78.6	0.3
Community Service	55.8	0.2
Housing Accompanied	404.0	1.4
Housing Unaccompanied	73.0	0.3
Industrial	2,533.3	8.9
Medical	26.5	0.1
Open Space	19,414.7	68.2
Outdoor Recreation	2,176.5	7.6
Training	904.0	3.2
Total	28,460.1	100

Source: USAF 2004

Notes:

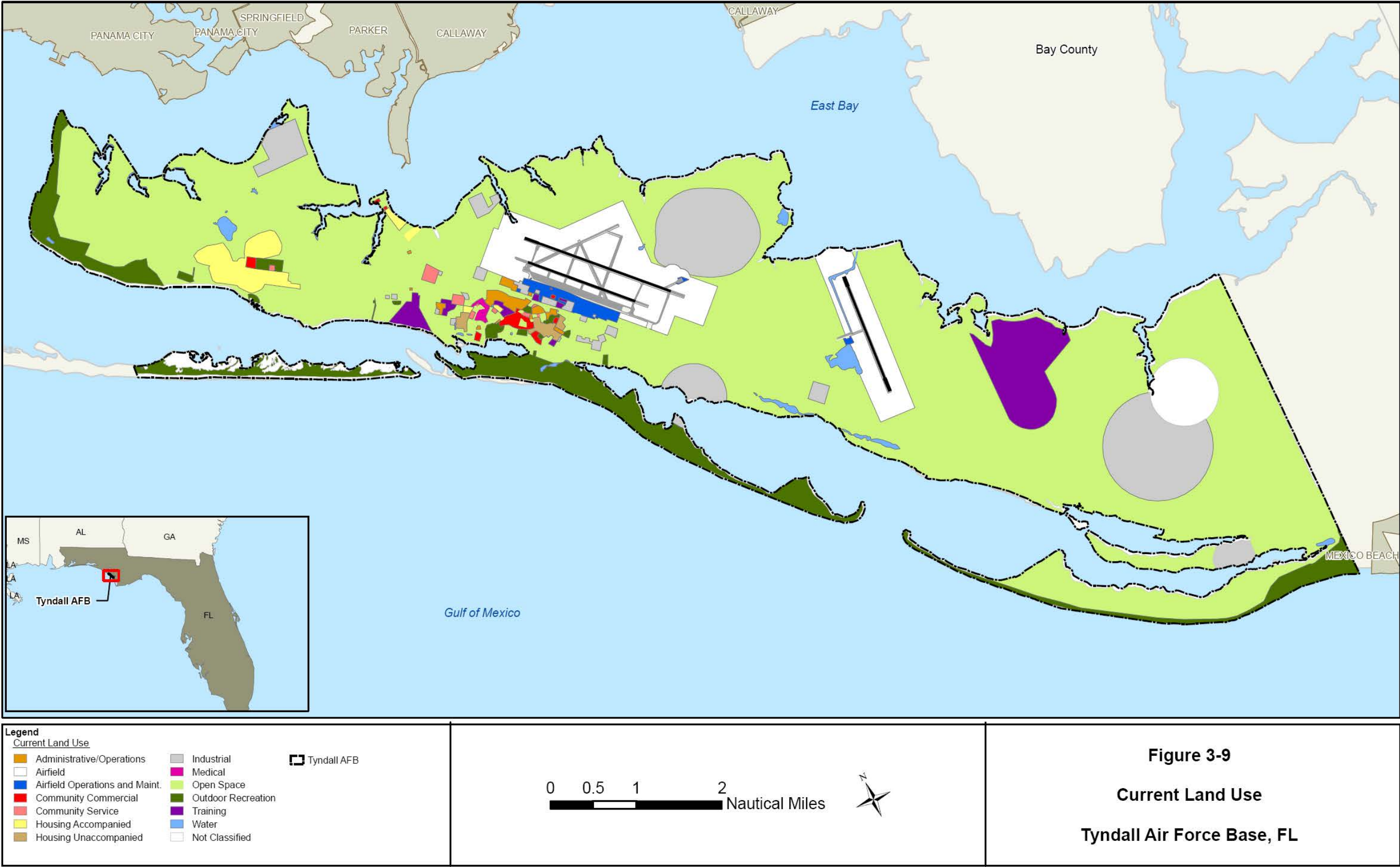
- Water land use, as shown on the *General Plan* map, was included in *Open Space* land use.
- Airfield Pavement land use, as shown on the *General Plan* map, was included in Airfield land use.

Figure 3-8 Land Use Relationships



Source: Air Force 2006

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3.3.4 Air Quality

3.3.4.1 Regional Meteorology

Tyndall AFB is located along the southern shore of the northwest extension of Florida, known as the “Panhandle of Florida,” approximately 13 miles east of Panama City, Florida. This area of Florida experiences distinct seasons with pleasant springs and autumns, mild winters and hot summers. Rainfall in the region is fairly evenly distributed throughout the year. The region experiences the occasional hurricane, which can cause locally heavy rainfall and high winds. There have been 38 hurricanes or tropical storms to pass within 60 miles of Panama City since 1870.

The average annual mean temperature for Tyndall AFB is 69 degrees Fahrenheit (°F). The average mean temperature during the summer months is 81°F, with record extremes of 53°F and 102°F. The average mean temperature during the winter months is 55°F, with record extremes of 6°F and 84°F. Tyndall AFB averages 80 days per year with temperatures above 90°F. Subfreezing temperatures occur an average of 14 days per year.

The average annual relative humidity is 78 percent. Mean precipitation is 58 inches per year, with July and August being the wettest months, and January and May as the driest. The average precipitation during summer months is 6.9 inches. The average precipitation during winter months is 4.2 inches.

The predominant wind direction is from the north. The average wind velocity is 6 miles per hour (mph), with a maximum-recorded 5-second wind speed of 79 mph. Thunderstorms occur an average of 66 days per year, with 56 percent of these occurring during June, July, and August. Tyndall AFB experiences, on average, 105 clear days and 137 cloudy days per year, with the remaining 123 days of the year being partly cloudy. Fog occurs an average of 128 days per year.

3.3.4.2 Air Quality Standards and Regulations

The USEPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the CAAA. The CAAA also set emission limits for certain air pollutants from specific sources, set new source performance standards based on best demonstrated technologies, and established national emission standards for hazardous air pollutants.

The CAAA specifies two sets of standards – primary and secondary – for each regulated air pollutant. Primary standards define levels of air quality necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards define levels of air quality necessary to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. Federal air quality standards are currently established for six pollutants (known as criteria pollutants), including carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur oxides (SO_x, commonly measured as sulfur dioxide – SO₂), lead, particulate matter equal to or less than 10 micrometers in aerodynamic diameter (PM₁₀) and particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter (PM_{2.5}). Although O₃ is considered a criteria pollutant and is measurable

in the atmosphere, it is often not considered as a pollutant when reporting emissions from specific sources, because O₃ is not typically emitted directly from most emissions sources. Ozone is formed in the atmosphere from its precursors – nitrogen oxides (NO_x) and volatile organic compounds (VOCs) – that are directly emitted from various sources. Thus, emissions of NO_x and VOCs are commonly reported instead of O₃.

The NAAQS for the six criteria pollutants are shown in Table 3-6. Units of measure for the standards shown in this table are micrograms per cubic meter of air (µg/m³), except for ozone, which is in parts per million (ppm).

The USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether the region meets federal primary and secondary air quality standards. An AQCR or portion of an AQCR may be classified as attainment, non-attainment, or unclassified with regard to the air quality standards for each of the criteria pollutants. “Attainment” describes a condition in which standards for one or more of the six pollutants are being met in an area. The area is considered an attainment area for only those criteria pollutants for which the NAAQS are being met. “Nonattainment” describes a condition in which standards for one or more of the six pollutants are not being met in an area. “Unclassified” indicates that air quality in the area cannot be classified and the area is treated as attainment. An area may have all three classifications for different criteria pollutants.

Table 3-6 National Ambient Air Quality Standards

Pollutant	Standard Value ($\mu\text{g}/\text{m}^3$) ^a	Standard Type
CO		
1-hour average	40,000	Primary
8-hour average	10,000	Primary
NO ₂		
Annual average	100	Primary and secondary
O ₃		
8-hour average ^b	0.075	Primary
Lead		
Quarterly average	1.5	Primary
PM ₁₀		
24-hour average ^c	150	Primary and secondary
PM _{2.5}		
24-hour average ^d	35	Primary
Annual average ^e	15	Primary
SO ₂		
3-hour average	1,300	Secondary
24-hour average	365	Primary
Annual average	80	Primary
Notes: CO = carbon monoxide $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter. NO ₂ = nitrogen dioxide O ₃ = ozone PM _{2.5} = particulate matter equal or less than 2.5 micrometers in diameter. PM ₁₀ = particulate matter equal or less than 10 micrometers in diameter. SO ₂ = sulfur dioxide ^a Units for ozone are parts per million (ppm). ^b To attain the 8-hour ozone standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. ^c The 24-hour standard for PM ₁₀ is not being exceeded more than once per year. ^d The PM _{2.5} 24-hour standard is based on the 3-year average 98th percentile of 24-hour concentrations at each population-oriented monitor, must not exceed 35 $\mu\text{g}/\text{m}^3$. ^e The PM _{2.5} annual standard is based on 3-year average of weighted annual arithmetic mean concentrations, must not exceed 15 $\mu\text{g}/\text{m}^3$.		

The CAAA requires federal actions to conform to any applicable state implementation plan (SIP). USEPA has promulgated regulations implementing this requirement (USEPA 2003a and USEPA 2003b). A SIP must be developed to achieve the NAAQS in non-attainment areas (i.e., areas not currently attaining the NAAQS for any pollutant) or to maintain attainment of the NAAQS in maintenance areas (i.e., areas that were non-attainment areas but are currently attaining the NAAQS). General conformity refers to federal actions other than those conducted according to specified transportation plans (which are subject to the Transportation Conformity Rule). Therefore, the General Conformity rule applies only to non-transportation actions in non-attainment or maintenance areas. Such actions must perform a determination of conformity with the SIP if the emissions resulting from the action exceed applicability thresholds specified for each pollutant and classification of nonattainment. Both direct emissions from the action itself and indirect emissions that may occur at a different time or place but are an anticipated consequence of the action must be considered. The Transportation Conformity Rule does not

apply to this project.

The applicability thresholds are 100 tons per year (tpy) for criteria pollutants, except for those given in Table 3-7.

Table 3-7 General Conformity Applicability Thresholds

NAAQS Pollutant	Type of Nonattainment or Maintenance Area	Applicability Threshold (tpy)
Ozone	Extreme NAAs	10 tpy VOC or NO _x
	Severe NAAs	25 tpy VOC or NO _x
	Serious NAAs	50 tpy VOC or NO _x
	Marginal or moderate NAAs inside an ozone transport region	50 tpy VOC (100 tpy NO _x)
	Maintenance areas inside an ozone transport region	50 tpy VOC (100 tpy NO _x)
CO	All NAAs	100 tpy
SO ₂	All	100 tpy
PM ₁₀	Serious NAAs	70 tpy PM ₁₀
	Moderate NAAs	100 tpy PM ₁₀
	All Maintenance areas	100 tpy
PM _{2.5}	All	100 tpy
Lead	All NAAs	25 tpy Pb
	All Maintenance areas	25 tpy Pb
Notes: CO = carbon monoxide NAA = nonattainment area NO _x = nitrogen oxides O ₃ = ozone Pb = lead PM _{2.5} = particulate matter equal or less than 2.5 micrometers in diameter PM ₁₀ = particulate matter equal or less than 10 micrometers in diameter SO ₂ = sulfur dioxide tpy = tons per year		

A number of actions are exempted from the requirements of general conformity including:

- Actions that do not have emissions increases.
- Actions with an emissions increase that is clearly *de minimis* (21 actions are listed; primarily actions that are administrative, legal, or routine in nature including routine movement of mobile assets, material and personnel as well as routine maintenance and repair).
- Actions that are not reasonably foreseeable or that respond to natural disasters or emergencies.
- Actions that have been approved under specified federal programs.

If an action triggers the applicability thresholds and is not exempt from the requirements, the Federal agency must demonstrate and document that the direct and indirect emissions would conform to the SIP. In particular, it must be demonstrated that the proposed and alternative actions would not:

- Cause or contribute to a new violation of an NAAQS.
- Interfere with the SIP.
- Increase the frequency or severity of existing violations.
- Delay attainment or any required progress toward that attainment.

The determination generally involves emission estimation and air quality modeling for the entire nonattainment or maintenance area (usually a multi-county area). If the initial conformity determination demonstrates that the proposed or alternative actions do not conform to the SIP, measures must be established and committed to mitigate the projected air quality impacts. A timeline for implementation of these measures may be specified; however, enforcement measures must also be established to ensure that they are implemented as required.

3.3.4.3 Regional Air Quality

Tyndall AFB is located within the Mobile (Alabama)-Pensacola-Panama City-Southern Mississippi (Alabama, Mississippi) Interstate AQCR (AQCR-5), which consists of the following counties: Baldwin, Escambia, and Mobile, Alabama; Bay, Calhoun, Escambia, Gulf, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington, Florida; and Adams, Amite, Claiborne, Clarke, Copiah, Covington, Forrest, Franklin, George, Greene, Hancock, Harrison, Hinds, Jackson, Jasper, Jefferson, Jefferson Davis, Jones, Lamar, Lauderdale, Lawrence, Lincoln, Madison, Marion, Newton, Pearl River, Perry, Pike, Rankin, Scott, Simpson, Smith, Stone, Walthall, Warren, Wayne, and Wilkinson, Mississippi. The Panama City-Lynn Haven Metropolitan Statistical Area (MSA) (Bay County) is currently USEPA designated as an attainment area for all criteria pollutants. Therefore, Tyndall AFB is not subject to the General Conformity regulations (40 CFR Parts 6, 51 and 93). However, the State of Florida has recommended that Bay County be designated as non-attainment for ozone by the Environmental Protection Agency. A formal designation is anticipated for March 2010. The FDEP has advised that this reclassification may impact project analysis in the future.

Florida is located in the region designated as the Visibility Improvement State and Tribal Association of the Southeast (VISTAS). VISTAS is a collaborative effort of state governments, tribal governments, and various federal agencies established to initiate and coordinate activities associated with the management of regional haze, visibility and other air quality issues in the Southeastern United States. VISTAS promotes the exchange of information between these states and other interested parties related to the control of air pollution.

On July 6, 2005, the USEPA finalized the “Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations.” This rule provides guidance to the states that are required to develop regulations for reducing the impacts of regional haze on Class I areas. Under the Clean Air Act, a Class I area is one in which visibility is protected more stringently than under the NAAQS, and includes national parks, wilderness areas, monuments, and other areas of special national and cultural significance. The nearest Class I area is Saint Marks National Wildlife Refuge, located approximately 69 miles from Tyndall AFB. In 1980, Bradwell Bay was excluded for purposes of visibility protection. There are no other Class I areas located within 124 miles of Tyndall AFB.

The guidance specifically addresses sources that were constructed between 1962 and 1977, contain an emission unit belonging to one of the 26 source categories, and emit more than 250 tpy. This rule does not apply to Tyndall AFB because they do not emit more than 250 tpy of a regulated pollutant.

3.3.4.4 Tyndall AFB Air Quality

An accurate emissions inventory is needed for assessing the potential contribution of a source or group of sources to regional air quality. An emissions inventory is an estimate of the actual and potential pollutant emissions generated by a source or sources over a period of time, normally a calendar year. The Panama City-Lynn Haven MSA emissions include emissions from point, area, non-road mobile, and on-road mobile sources. Stationary emission sources at Tyndall AFB include boilers, generators, surface coating, paint booths, storage tanks, fueling operations, and woodworking operations, among others. Mobile emission sources include: aircraft flight operations, on-wing engine testing, aerospace ground equipment, government owned on-road vehicles, and non-road vehicles. Table 3-7 compares the 2007 actual emissions for Tyndall AFB and the 2002 Panama City-Lynn Haven MSA emissions. As shown in Table 3-8, Tyndall AFB contributes a small amount to the Panama City-Lynn Haven MSA emission totals.

Table 3-8 Panama City-Lynn Haven MSA Emissions and Tyndall AFB Actual Emissions

	Annual Emissions (tpy)					
	CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}
2002 Panama City-Lynn Haven MSA Emission Inventory ^{a,c}	66,328	14,853	13,232	17,067	6,064	6,064
2007 Tyndall AFB Actual Emissions ^{b,c}	1,653	343	581	15.1	84.0	84.0
Percent of Regional Emissions ^d	2.5	2.3	4.4	0.089	1.4	1.4
Notes: AFB = Air Force Base MSA = metropolitan statistical area O₃ = ozone PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter tpy = tons per year CO = carbon monoxide NO_x = nitrogen oxides SO₂ = sulfur dioxide PM₁₀ = particulate matter equal or less than 10 micrometers in diameter ^a Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Panama City-Lynn Haven MSA consists of Bay County. Source: USEPA 2002, AIRData; Emissions come from an extract of USEPA's National Emission Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html ^b Stationary Sources: Annual Air Emissions Report for 2007, consisting of FDEP forms and Automated Project Management System data forms as backup. Ozone depleting substance emissions not specifically tracked. Mobile Sources: MACTEC Mobile Source Emission Inventory, 2004. Assumed 2007 mobile actual emissions equal to 2004. Actual emissions are the air pollutant emissions that result from the actual operation and material usage quantities during a one-year period (i.e., typically a calendar year). ^c PM_{2.5} emissions assumed = PM₁₀ emissions. ^d Compares 2007 Tyndall AFB actual emissions to 2002 Panama City-Lynn Haven MSA emissions.						

3.3.5 Earth Resources

3.3.5.1 Definition of the Resource

An area's geological resources typically consist of surface and subsurface materials and their inherent properties. Principal factors influencing the ability of geological resources to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), topography, and soil stability.

Seismic properties indicate the potential for earthquake activity in an area. Those regions of the country that have subsurface shifting, faulting, or crustal disturbance are more likely to be affected by earthquake activity.

Topography is defined as the relative positions and elevations of the natural or human-made features of an area that describe the configuration of its surface. An area's topography is influenced by many factors, including human activity, seismic activity of the underlying geological material, climatic conditions, and erosion. Information about an area's topography typically encompasses surface elevations, slope, and physiographic features (i.e., mountains, ravines, or depressions).

The term “soil” generally refers to unconsolidated materials lying over bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil depth, structure, elasticity, strength, shrink-swell potential, and erodibility determine a soil’s ability to support man-made structures and facilities. Soils are typically described in terms of their series or association, slope, physical characteristics, and relative compatibility or constraints with respect to particular construction activities and types of land use.

3.3.5.2 Geology

There are two major environments present at Tyndall AFB: coastal and interior. The coastal environment includes sand dunes, beaches, bayous, and tidal marshes. The interior environment has moderately well drained, gently sloping uplands, poorly drained flatwoods, and wetlands. The peninsula has a maximum elevation of less than 30 feet above MSL and the established airfield is 18 feet above MSL (USAF 2004).

3.3.5.3 Topography

Tyndall AFB is located within the East Gulf Coastal Plain physiographic province, a former sea bottom. The installation falls within two physiographic subdivisions of the Gulf Coastal Lowlands: Beach Dunes/Wave-cut Bluffs and Flatwoods Forests. Sediments from upstream sand, clay, and gravel were deposited on the coastal plain as sea level varied with glacial periods. Swamps were developed in the stream beds and bays of deeply eroded streams along the coastal plain (USAF 2004).

3.3.5.4 Soils

There are five predominant soil types on Tyndall AFB. They include: Kureb-Resota-Mandarin, Hurricane-Chipley-Albany, Pottsburg-Leon-Rutlege, Rutlege-Allanton-Pickney, and Bayvi-Dirego. Most of the soil at Tyndall AFB is sandy and acidic, with moderate to good productivity for timber (USAF 2004).

The Kureb-Resota-Mandarin soils are nearly level to gently sloping. They are excessively drained, moderately well drained, and somewhat poorly drained soils that are sandy to a depth of 80 inches or more. Some of the layers of Kureb-Resota-Mandarin soils contain organic stained sandy layers.

Hurricane-Chipley-Albany soils are nearly level to gently sloping and are somewhat poorly drained. Some of the soils are sandy throughout and others are sandy to a depth of 40 inches or more and are loamy below.

Pottsburg-Leon-Rutlege soils are nearly level and are poorly drained and very poorly drained soils. They are sandy to a depth of 80 inches or more and contain some organic stained layers.

Rutlege-Allanton-Pickney soils are nearly level or depressional and are very poorly drained or poorly drained. They are sandy to a depth of 80 inches or more and some contain organic stained layers.

Bayvi-Dirego soils are nearly level and very poorly drained. Some of the soils are sandy to a depth of 80 inches or more while others are organic to a depth of 14 to 30 inches and are sandy below.

3.3.6 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats in which they occur. The natural resources at Tyndall AFB are managed under an Integrated Natural Resource Management Plan (INRMP) (USAF 2006a). For the purposes of this analysis, biological resources are divided into the categories of vegetative communities, wildlife including mammals and bird species, and federally threatened and endangered, or state listed species of concern.

The United States Fish and Wildlife Service (USFWS) is responsible for the recovery of federally listed threatened and endangered species under the Endangered Species Act of 1973. The Florida Fish and Wildlife Conservation Commission provide management support for wildlife at the state level.

3.3.6.1 Vegetation

As the largest installation in Air Education and Training Command, Tyndall AFB is located in the southern portion of Bay County, Florida. The base encompasses 28,460 acres of a peninsula that forms the southeastern shoreline of St. Andrews Sound. Tyndall AFB lies within the Gulf Coastal Lowlands physiographic region (Puri and Vernon 1959) and is located in the Southern Evergreen Forest Region of the outer West Coastal Plain. This region is typified by the presence of longleaf pine and scrub oak forests (USAF 2006a).

Vegetation found on Tyndall AFB is consistent to that within the eco-region described above. Much of the historical vegetation of Tyndall AFB has been altered by past human activity. The native vegetation of the installation has been impacted by agricultural and silvicultural activities that occurred prior to the base's inception. Sand and slash pine plantations have replaced much of the native longleaf pine communities for timber production. Although Tyndall AFB manages pine plantations for commercial harvest, the focus of the forest programs has shifted to less commercial strategies and more towards the restoration of historic vegetative communities and conditions through natural regeneration of native species, prescribed burning, and selective forest thinning. The 2006 Tyndall AFB INRMP has set goals for the restoration of longleaf pine communities. The installation is restoring approximately 200 acres of Sand Pine Scrub into Longleaf Pine each year (USAF 2006a).

Biological surveys of the area found nine distinct vegetation areas dominated by: Mesic/Wet Slash flatwoods, Natural Longleaf Pine, Sand Pine Scrub, Maritime Hardwood Hammock, Coastal Upland, Tidal Salt Marsh, Slash Scrub, and Freshwater Wetlands (Wet prairie, Basin Swamp, Baygall, and Floodplain Swamps) which are intermixed and found throughout the installation (USAF 2006a). The 2006 Tyndall AFB INRMP provides detailed descriptions of each of these communities.

Turf grasses and other landscaping vegetation have been planted on semi-improved and improved areas on Tyndall AFB. The installation land management program determines acceptable species for landscaping grasses, shrubs, and trees for these areas (USAF 2006a).

3.3.6.2 Wildlife

Wildlife at Tyndall AFB is consistent with those expected to occur in the various habitats and vegetative communities described above. Inventories of the installations fish and wildlife species are based on studies conducted by 325 CES/CEANN and Florida Natural Areas Inventory. Common species observed on the installation include white-tailed deer (*Odocoileus virginianus*), mourning dove (*Zenaida macroura*), wood duck (*Aix sponsa*), marsh rabbit (*Sylvilagus palustris*), gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*) (FFWCC 2005).

3.3.6.3 Rare, Threatened, and Endangered Species

Due to the variety of habitats available within the boundaries of Tyndall AFB, faunal diversity is high. A total of 22 listed plant species, including one federally-listed species, have been documented on and in the immediate vicinity of Tyndall AFB (Table 3-9). Most of the plant species at Tyndall AFB occur on the barrier islands or within wetlands where interaction with the military mission are minimal.

Table 3-9 Listed Plant Species Documented at Tyndall AFB or in the Immediate Vicinity

Common Name	Scientific Name	Federal Status	State Status	Habitat
Violet-flowered Butterwort	<i>Pinguicula ionantha</i>	T	E	Cypress domes
Chapman's Crownbeard	<i>Verbesina chapmanii</i>		T	Wet prairie
Large-leafed Jointweed	<i>Polygonella macrophylla</i>	C	T	Scrub
Southern Milkweed	<i>Asclepias viridula</i>	C	T	Wet prairie
Chapman's Butterwort	<i>Pinguicula planifolia</i>	C	T	Wet prairie
Drummond's Yellow-eyed Grass	<i>Xyris drummondii</i>	C		Wet prairie, flatwoods
Godfrey's Golden Aster	<i>Chrysopsis godfreyi</i>	C	E	Dunes
Gulf Coast Lupine	<i>Lupinus westianus</i>	C	T	Scrub, dunes
Harper's Yellow-eyed Grass	<i>Xyris scabrifolia</i>		T	Wet prairie
Quillwort Yellow-eyed Grass	<i>Xyris isoetifolia</i>	C	E	Wet prairie
Karst Pond Yellow-eyed Grass	<i>Xyris longisepala</i>		E	Upland lake shoreline
Apalachicola Dragonhead	<i>Physostegia godfreyi</i>		T	Wet prairie
Bog Tupelo	<i>Nyssa urisne</i>	C		Wet prairie
Decumbent Pitcher Plant	<i>Sarracenia purpurea</i>		T	Wet prairie, bogs
Dew Thread Sundew	<i>Drosera filiformis</i>		E	Wet prairie
Giant Water Dropwort	<i>Oxypolis greenmanii</i>		E	Wet prairie, ditches
Henry's Spider Lily	<i>Hymenocallis henryae</i>	C	E	Cypress stringers
Parrot Pitcher Plant	<i>Sarracenia psittacina</i>		T	Wet prairie, bogs
Southern Red Lily	<i>Lilium catesbaei</i>		T	Wet prairie
Spoon-leafed Sundew	<i>Drosera intermedia</i>		T	Wet prairie
Thick-leaved Water Willow	<i>Justica crassifolia</i>	C	E	Wet prairie
White-flowered Wild Petunia	<i>Ruellia noctiflora</i>		E	Wet prairie
Source: FFWCC 2008 and USFWS 2008				
Note: E= Endangered, T= Threatened, and C= Consideration encouraged.				

A total of 27 listed animal species have been documented on or in the vicinity of Tyndall AFB. Table 3-10 presents the listed species and the habitat types they utilize. As presented in Table 3-10, the listed species include eight species of reptiles, 14 species of birds, one species of fish and four species of mammals. Eleven of these species are federally-listed as Threatened or Endangered. Similar to the plant species, the majority of these species prefer habitats on the barrier islands or with wetland communities where there is minimal interaction with the military mission. The beaches of the barrier islands are important nesting sites for loggerhead sea turtles, and several listed shorebirds (e.g., least tern and piping plover). The dune communities are vital habitat for the Choctawhatchee and St. Andrews beach mice. Hence, all beach and dune habitats of Shell Island, Crooked Island East, and Crooked Island West have been designated by USFWS as Critical Habitat Areas from the shoreline to 1.5 miles out, from 1 April to 15 September (USAF 2006a).

Table 3-10 Listed Animal Species Documented at Tyndall AFB or in its Immediate Vicinity

Common Name	Scientific Name	Federal Status	State Status	Habitat
REPTILES				
American Alligator	<i>Alligator mississippiensis</i>	T(S/A)	SSC	Lakes, marshes
Atlantic Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	T	Marine, barrier island
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	E	E	Marine
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E	E	Marine, barrier island
Green Sea Turtle	<i>Chelonia mydas</i>	E	E	Marine, barrier island
Alligator Snapping Turtle	<i>Macrolemys temmincki</i>	C	SSC	Freshwater lakes
Gopher Tortoise	<i>Gopherus polyphemus</i>	C	SSC	Longleaf & sand pine
Gulf Salt Marsh Snakes	<i>Nerodia clarkia clarkii</i>	C		Needless grass
BIRDS				
Southeastern American Kestrel	<i>Falco sparverius paulus</i>	C	T	Open habitat
Osprey	<i>Pandion haliaetus</i>		SSC	Coastline, lakes
Peregrine Falcon	<i>Falco peregrinus tundrius</i>	C	E	Open habitats
Little Blue Heron	<i>Egretta caerulea</i>		SSC	Marshes, ponds, lakes
Tricolor Heron	<i>Egretta tricolor</i>		SSC	Marshes, ponds
Reddish Egret	<i>Egretta rufescens</i>		SSC	Marshes, coastline
Snowy Egret	<i>Egretta thula</i>		SSC	Marshes, lakes, ponds
Black Skimmer	<i>Rhychops niger</i>		SSC	Shoreline
American Oystercatcher	<i>Haematopus palliatus</i>		SSC	Shoreline
Least Tern	<i>Sterna antillarum</i>		T	Barrier island, shores
White Ibis	<i>Eudocimus albus</i>		SSC	Marshes, lakes
Brown Pelican	<i>Pelecanus occidentalis</i>		SSC	Barrier island, bays
Piping Plover	<i>Charadrius melodus</i>	T/CH	T	Barrier island
Snowy Plover	<i>Charadrius alexandrinus</i>	C	T	Barrier island
MAMMALS				
West Indian Manatee	<i>Trichechus manatus</i>	E	E	Marine
Choctawhatchee Beach Mouse	<i>Peromyscus polionotus altophrys</i>	E/CH	E	Barrier island
St. Andrew Beach Mouse	<i>Peromyscus polionotus peninsularis</i>	E/CH	E	Barrier island
Florida Black Bear	<i>Ursus americanus floridanus</i>	C	T	Swamps, forests
FISH				
Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T/CH	SSC	Marine, large rivers
Data obtained from FFWCC 2008 and USFWS 2008				
Note: E= Endangered, T= Threatened, T(S/A)= Threatened by similarity of appearance, SSC= Species of Special Concern, CH= Critical habitat designation, and C= Consideration encouraged.				

3.3.6.4 Wetlands

Approximately 40 percent of Tyndall AFB is estimated to be wetland habitat (USAF 2006a). EO11990, *Protection of Wetlands*, May 24, 1977, directs federal agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetlands, and the proposed construction incorporates all possible measures to

limit harm to the wetland. The CWA sets the basic regulatory framework for regulating discharges of pollutants to US waters. Section 404 of the CWA establishes a federal program to regulate the discharge of dredged and fill materials into waters of the US, including wetlands. Four federal agencies are responsible for identifying and regulating wetlands: the United States Army Corps of Engineers (USACE), USEPA, USFWS, and US Department of Agriculture Natural Resources Conservation Service (NRCS). The USACE and USEPA are primarily responsible for making jurisdictional determinations and regulating wetlands under Section 10 of the *Rivers and Harbors Act of 1899*. The NRCS has developed procedures for identifying wetlands for compliance with the *Flood Security Act of 1985* and the USFWS has developed the National Wetlands Inventory (NWI) classification system for identifying wetlands.

Wetlands on Tyndall AFB have been mapped and classified in accordance with USFWS NWI classification system as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Based on the NWI classification system, the primary types of wetlands on the installation are Palustrine Aquatic/Emergent, Palustrine Forested, and Estuarine, with Palustrine Forested, which are the dominant type in terms of total coverage. Palustrine Forested wetlands on Tyndall AFB primarily include basin swamps, baygalls, floodplain swamps, and hydric flatwoods. Palustrine Aquatic/Emergent wetlands include wet prairies and hydric herbaceous systems associated with interdunal swales and coastal lakes. Estuarine wetlands on Tyndall AFB are tidal salt marshes. Further details and descriptions of the wetlands are provided in the Tyndall AFB INRMP (USAF 2006a).

3.3.7 Cultural Resources

3.3.7.1 Regulations and Criteria

Cultural resources are prehistoric and historic sites, districts, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. A historic district is an area that “possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (NPS 1997).

Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act (NHPA) (especially Sections 106 and 110), the ARPA, the American Indian Religious Freedom Act (AIRFA), and the Native American Graves Protection and Repatriation Act. Under AIRFA, Tyndall AFB has no known traditional cultural properties or sacred sites to which the base must provide access.

Section 106 of NHPA requires that federal agencies give the Advisory Council on Historic Preservation a “reasonable opportunity to comment” on proposed actions. Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated under the NRHP criteria. Properties that are either listed on or eligible for listing in the NRHP are provided the same measure of protection under Section 106.

The following criteria have been established as guidance for evaluating potential entries to the NRHP. “Significance” in American history, architecture, archeology, and culture is granted to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that meet at least one of the following criteria:

- an association with events that have made a significant contribution to the broad patterns of history (Criterion A);
- an association with the lives of persons significant in history (Criterion B);
- embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguished entity whose components may lack individual distinction (Criterion C); or
- have yielded, or may likely yield, information important in prehistory or history (Criterion D).

Resources less than 50 years of age must be evaluated under Criterion Consideration G: Properties That Have Achieved Significance in the Last Fifty Years. This criterion requires that such resources be “exceptionally important” to qualify for listing. Resources less than 50 years of age must also meet the criteria for resources 50 years or older (i.e., A, B, C, or D) and retain their integrity.

3.3.7.2 Archaeological Resources

3.3.7.2.1 Previous Investigations

Some very early archaeological investigations took place on the Gulf Coast of Florida during the nineteenth century. These were primarily concerned with the shell middens and burial mounds that are the most visible component of the archaeological record on the Gulf Coast, though at that time there was some question as to who or what had actually created these features. The mid to late nineteenth century period of archaeological research on the Gulf Coast of Florida was “not a brilliant one,” however the turn of the century would bring two remarkable researchers into northwest Florida (Willey 1949).

The first of these researchers was Clarence Bloomfield Moore (1900, 1902, 1918), who performed the first recorded excavations on what is now Tyndall AFB. It is easy to condemn Moore for his destructive activities, as he recorded no information other than artifact lists, poorly documented site locations, and some comments on the more interesting bodies he dug up. However, Moore is to be lauded for promptly publishing his data and providing for the curation of the materials he recovered, neither of which was typical at the time. Many antiquarians and treasure hunters of the time left no record at all of their excavations; nor were their intentions always of the same caliber as those of Moore.

Moore (1902) began his second northwest Florida survey in the St. Andrew Bay area and describes six sites located on what is now Tyndall AFB. These were Davis Point, west and east (8BY7 and 8BY8), Pearl Bayou (8BY137), Strange’s Landing (8BY124), Baker’s Landing (8BY29), Hare Hammock Large (8BY30), and Hare Hammock Small (8BY31).

The second of these researchers was W. H. Holmes (1894a, 1894b, 1903). Holmes' genius was in the analysis of material collected by others, in particular the large collections made by C.B Moore (Holmes 1894a). Holmes moved away from archaeology as the collection and listing of discrete phenomena towards archaeology as the study of classes of related phenomena. He put Floridian material into the context of the Southeastern United States and the Caribbean and organized the ceramics he examined from northwest Florida into three major ware classes: Mobile-Pensacola, Apalachicola, and Appalachian (Homes 1903).

The watershed project that marked the beginning of modern archaeological investigations in the area began with survey of the Florida Gulf Coast performed by Gordon Willey and Richard Woodbury in 1940 (Willey and Woodbury 1942). Several years later, Willey (1949) used the results of that survey, along with "every scrap of pertinent data then available" to produce his seminal synthesis of the culture history of Florida's Gulf Coast (Bullen 1973). Willey's taxonomy and chronology of ceramic styles have been the basis of all work since that time in the area. During the survey and excavations, Willey visited two sites on what is now Tyndall AFB: Davis Point, west (8BY7) and Pearl Bayou (8BY24). He documented collections from the other sites on East Peninsula found by Moore and by Frank M. Setzler, who performed a brief survey in the area for the United States National Museum in 1932, but Willey could not relocate these sites due to poor documentation (Willey 1949).

Very few investigations occurred on Tyndall AFB from the time of the 1940 Willey and Woodbury survey to the late 1970s, when statutory requirements increased activity related to cultural resources on the base. A few exceptions, however, did occur. In 1955, Richard Adams, an avocational archaeologist stationed on Tyndall AFB, conducted limited excavations on 8BY7. He noted that the site yielded a Weeden Island assemblage and that it was in danger from looting and activities associated with the US Air Force occupation of the site (Adams 1957). Louis Tesar, working for the Florida Division of Historical Resources, undertook a survey of the St. Andrew Bay area during 1965. His survey located two new sites on Tyndall AFB, Redfish Point (8BY78) and Cromanton Point (8BY91); both are described as intact Weeden Island sites (Tesar 1965).

In 1966, Tyndall AFB, as a federal installation, became subject to the NHPA and its subsequent amendments. Section 110 of the NHPA requires all federal agencies to identify cultural resources on all property under their control and to protect and manage identified historic properties that are eligible or potentially eligible for nomination to the NRHP. This act, along with other regulations, statutes and standards, would come to drive the majority of archaeological investigations at Tyndall AFB.

In 1976 the U.S. Army Corps of Engineers conducted a cultural resources survey in advance of the construction of a drone runway and support facilities (Nielsen 1976). The investigation consisted of a pedestrian survey of all areas of exposed ground in the planning area, which produced a single ceramic sherd found in a firebreak. More influentially, the report included a cultural resources management plan, which suggested work stoppage in the event of cultural material being found during the course of future construction on the base.

Knudsen's 1979 survey under the auspices of the Florida State University Southeast Conservation Archeology Center of the coasts of Tyndall AFB and a very limited inland sample was the first substantive cultural resources management survey on the base. Utilizing walk over and the

occasional use of a one-inch diameter coring tool, Knudsen surveyed 200 yards (183 meters) inland from the high water mark. Where possible, Knudsen and his crew crossed bayous rather than surveying their full coastlines. Due to an underestimation of the length of the coastline surveyed, the inland sample was only 10 percent of the total area of the base, and this was performed only in places with exposed ground surface (Knudsen 1979). This survey found 57 new sites, mostly along the coast. Knudsen developed a predictive model that associated sites with elevated areas along the coasts. Undoubtedly, there was a relationship between elevated coastal areas and sites found during this survey, but the survey methods guaranteed such an outcome. Knudsen (1979) noted that predictive models based on modern vegetative patterns on Tyndall AFB do not take into account the temporal variation that is quite obvious in the area. Knudsen (1979) addresses the inadequacies of this project with an explicit assessment of his methods, especially in respect to the lack of subsurface testing, but this survey did much to highlight the variability and richness of the cultural resources present on the base.

The construction of the Tyndall AFB Marina Services Facility led to the 1981 evaluation of 8BY138 by Piper Archeological Research, Inc. (Piper et al. 1981). Though producing a substantial quantity of material during excavation, the site was considered to be too severely disturbed to be eligible for inclusion in the NRHP.

The next substantial blocks of survey were performed on Tyndall AFB by New World Research (NWR) in 1984 (Thomas and Campbell 1985) and 1988 (Mikell et al. 1989). The survey methods followed by NWR were a vast improvement over previous work by Knudsen. The NWR methods involved consistent 30-meter transect intervals and shovel tests excavated at intervals of not more than thirty meters with additional test units as suggested by topography and positive shovel tests. However, the inland survey was limited to small survey plots and “spot checks of interior areas crossed during movement from one location to another including locations and areas judgmentally determined to be likely site locations on our preliminary sensitivity map” (Thomas and Campbell 1985). Although based on a wider array of variables, the predictive model produced by NWR was still based on previously discovered sites, almost all of which were found during coastal surveys.

Prentice Thomas and Associates (PTA) conducted the first truly systematic survey on Tyndall AFB of a three hundred acre interior area in preparation for a housing unit being built on the base (Thomas et al. 1993). While PTA differentially tested high and low probability areas, all areas were surveyed. High probability areas were tested on a 25-meter grid, and low probability areas were tested at variable intervals dependent on field observation that did not exceed 50 meters. PTA encountered nine sites, two of which were determined to be potentially eligible, thus showing that the interior of Tyndall AFB potentially contains significant archaeological sites.

In May of 1994, one of the sites encountered during the PTA survey, 8BY804 (the Morehead Site), was tested for eligibility by Southeastern Archeological Service, Inc. (SAS) (Gresham et al. 1994). The site is a preceramic Late Archaic site with some affinities with the Elliot’s Point Complex, a regional variation on the Poverty Point Complex of the Lower Mississippi River Valley. Because of its age and apparently important place in the archaeological record as a representative of a poorly understood stage in the development of northwest Floridian cultures, 8BY804 was recommended as being eligible for inclusion in the NRHP (Gresham et al. 1994).

In 2004 Geo-Marine, Inc. (GMI) conducted archaeological boundary delineation for 22 prehistoric archaeological sites and assessment for site eligibility for inclusion in the NRHP for eight of these same sites on Tyndall AFB. Site 8BY804 was included among the sites requiring boundary delineation. This project resulted in four sites being recommended as ineligible (8BY138, 8BY693, 8BY176, and 8BY692). Four additional sites were found to retain good contextual integrity and a robust artifact assemblage and were recommended as meeting NRHP eligibility requirements (8BY29, 8BY30/31, 8BY159, and 8BY78/164).

In February of 2004, GMI conducted additional boundary delineation work at site 8BY804 (Lintz et al. 2006). In order to delineate the site boundary, Geo-Marine personnel excavated 32 50-x-50-cm shovel tests, primarily around the perimeter of the original site boundary as previously defined by Thomas et al. (1993). A total of 14 of the 32 shovel tests dug at the site yielded archaeological remains. Chipped stone lithic material dominates the artifacts recovered from site 8BY804. The results of the 2004 investigation by GMI determined that the limits of this site were much larger than was previously defined by the initial survey excavation of shovel tests in a cruciform pattern across the site. Because of the 14 positive shovel tests among the total 32 excavated along the site perimeter, the site boundary was expanded to cover an area of about 280 m (north-south) by 140 m (east-west), or nearly three times as large as the original site boundary.

In September of 2005, an archaeological survey of 148 acres was conducted by GMI as part of planning efforts for proposed housing construction. The archaeological survey involved pedestrian survey, shovel testing, mapping, and site recording within two areas (Saddle Club and Redfish Extension) totaling 148 acres. This work resulted in the discovery of five new archaeological sites (8BY1294, 8BY1295, 8BY1296, 8BY1297, and 8BY1298), the identification of 13 isolated finds, and boundary redefinition of a previously recorded site (8BY804). Preliminary site evaluations were conducted at all sites in order to determine their potential for eligibility for listing on the NRHP. Of the five newly recorded sites, four (8BY1295, 8BY1296, 8BY1297, and 8BY1298) lack contextual integrity and the potential to provide data important to an understanding of prehistory; therefore, they were recommended ineligible for inclusion in the NRHP. Site 8BY1294, however, exhibits good potential for relatively discrete subsurface deposits and a data set that will contribute to an understanding of Late Weeden Island occupation of coastal areas; therefore, it was recommended potentially eligible for inclusion in the National Register of Historic Places.

3.3.7.2.2 Archaeological Properties

Previous investigations have resulted in the recording of 104 archaeological sites on Tyndall AFB property. Boundary delineation and NRHP-eligibility determinations remain incomplete for many of these sites. The SHPO has concurred with NRHP-eligibility determinations for 35 archaeological sites managed by Tyndall AFB. Seventeen sites are considered eligible, three potentially eligible, and fifteen sites ineligible for inclusion in the NRHP. According to the 2003 Installation Cultural Resources Management Plan (SAC/NPS 2003), Tyndall AFB has a total of 28,500 acres, of which 3,860 acres are within the cantonment area. Since the cantonment area represents an area which has been disturbed by previous construction, no further archaeological survey is considered necessary. However, approximately 24,000 acres of Tyndall AFB remain unsurveyed for archaeological sites. The potential for archaeological sites, in both coastal and interior areas, is high.

3.3.7.3 Historic Resources

3.3.7.3.1 Previous Investigations

Two architectural investigations (Nash 1979, and Durst and Wang 1996) have been conducted for Tyndall AFB. The first investigation discussed only two resources that were historic (50 years of age or older) at the time of the survey. These two buildings, the Commander's Residence (Building 2715) and the Golf Course Clubhouse (Building 3029) were pre-military buildings. A re-evaluation of these two buildings in 1996 (Durst and Wang) determined that neither building retained its integrity due to alterations and additions. Therefore, both buildings were recommended as ineligible for listing on the NRHP (SAC/NPS 2003).

A more comprehensive architectural survey was conducted by Hardlines (Durst and Wang 1996) for all buildings and structures constructed prior to 1955. In this investigation, 19 WWII resources (Buildings 156, 453, 535, 538, 634, 703, 743, 820, 1003, 1356, 1420, 1422, 1424, 1476, 1580, 1582, 6004, 6014, and 6032) were identified as potentially eligible for listing on the NRHP (SAC/NPS 2003).

3.3.7.3.2 Historic Properties

Of the 76 buildings proposed for demolition under the Proposed Action and PDA, 39 are WWII-era buildings (Buildings 149, 444, 471, 472, 531, 535, 1125, 1129, 1140, 1532, 1604, 1612, 1750, 743, 745, 822, 916, 920, 1003, 1027, 1613, 449, 450, 453, 470, 909, 6014, 6016, 6022, 529, 653, 806, 808, 816, 1013, 1015, 1530, 1614, and 6027), 35 are Cold War-era buildings (Buildings 546, 560, 561, 562, 968, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1265, 1275, 1277, 1279, 1282, 1283, 1615, 419, 421, 422, 425, 451, 457, 458, 474, 950, 1352, 214, 1616, 1617, 1680, and 6030), and three buildings (Buildings 266, 1127 and 1016) are of post-Cold War construction.

Headquarters Air Education and Training Command has determined that the WWII buildings at Tyndall AFB, including those recommended potentially eligible by Hardlines, may be demolished under the 1986 nationwide Programmatic Agreement (PA) for WWII temporary buildings (SAC/NPS 2003). Therefore, the WWII buildings proposed for demolition need no further evaluation or consultation with the SHPO.

Cold War-era buildings constructed in 1955 or later have not been evaluated for NRHP eligibility. During the Cold War, Tyndall AFB played multiple roles in military defense and training. At the start of the Cold War the base fell under Tactical Air Command, but became a part of Air University within a few months. In 1950, Tyndall AFB was assigned to Air Training Command with a mission to train all-weather jet interceptor pilots and aircraft controllers. In 1957, the base was transferred to Air Defense Command with several new missions that included weapons training, systems evaluation, tactics and equipment testing, and tactical air defense. On October 1, 1979, the base was assigned again to Tactical Air Command. When the 325th Fighter Weapons Wing was activated in 1981, Tyndall AFB gained a new mission with F-101, F-106, and T33 aircraft. Two years later, the F-15 was added to Tyndall's aircraft inventory (SAC/NPS 2003 and USAF 2007b).

Of the buildings proposed for demolition, six (Buildings 546 [Flight Simulator Training, constructed in 1955], 968 [Army Air Force Exchange Service–Service Station, constructed in

1948], 1265 [Combat Arm Training Maintenance Classroom Facility, constructed in 1957], 1277 [Ground Control Intercept, constructed in 1957], 1279 [Ground Control Intercept, constructed in 1955], 1283 [Ground Controlled Approach Pad, constructed in 1956]) are 50 years of age or older. Both buildings should be evaluated to determine their level of integrity and whether or not they hold historical or architectural significance.

Buildings 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1615, 419, 421, 422, 425, 451, 457, 458, 474, 1352, 214, 1616, 1617, 1680, 6030, 560, 561, 562, 950, and 1282 are all under 50 years of age. To be eligible for listing on the NRHP, these buildings must hold exceptional importance under Criterion Consideration G for properties less than 50 years of age. In addition, they must meet one or more of the standard criteria (A—D) and retain integrity.

All 28 Cold War-era resources under 50 years of age serve housing, base support, storage, maintenance, or training functions. Of these 28 resources, 12 are dormitories, houses or lounges/dayrooms (Buildings 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1615, 1616, 1617, and 1680). Seven of the 28 resources are storage sheds or facilities (Buildings 419, 422, 425, 1352, 457, 458, and 451). Three buildings are vehicle shops or stations (Buildings 560, 561, and 562). The remaining six resources include an administrative office (Building 421), fire station (Building 214), maintenance shop (Building 474), pavement/grounds facility (Building 6030), Base Exchange (Building 950), and academic lecture hall (Building 1282).

Due to their role in providing housing or base support, 19 of the Cold War-era resources under 50 years of age did not have a direct association with the Tyndall AFB Cold War mission, and thus, are not likely to meet the requirement for exceptional significance under Criterion Consideration G. Included in this group are Buildings 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1615, 1616, 1617, and 1680 (dormitories and lounges/dayrooms); Building 421 (administrative office); Building 214 (fire station); Building 6030 (pavement/grounds facility); Buildings 560, 561, and 562 (vehicle maintenance shops or stations); and Building 950 (base exchange). These buildings are recommended not eligible for listing on the NRHP due to lack of exceptional importance.

The significance of nine Cold War-era resources under 50 years of age is unclear at this time. The storage buildings (Buildings 419, 422, 425, 1352, 457, 458, and 451), maintenance shop (Building 474), and academic lecture hall (Building 1282) may have had a direct association with Tyndall AFBs' Cold War mission, and consequently, may meet the requirement for exceptional importance. With the exception of one building (Building 425), all others in this group were constructed during the period in which Tyndall AFB, under Air Defense Command, conducted weapons training, systems evaluation, tactics and equipment testing, and tactical air defense. It is possible that the storage facilities, maintenance shop, and academic lecture hall were directly associated with this mission, and they may have continued to play an important role in later Cold War missions. Building 425 was constructed in 1988 during Tyndall AFB's association with Tactical Air Command. All nine buildings would require further evaluation for determining historical or architectural significance, and level of integrity.

Building 1127 (headquarters administrative office), Building 1016 (cadet quarters) and Building 266 (warehouse) were constructed in 1992, 1998, and 1998, respectively. As resources under 50 years of age with no association to an important national event such as the Cold War, these buildings require no evaluation or consultation with the SHPO prior to demolition.

To summarize the status of historic resources at Tyndall AFB scheduled for renovation or demolition:

- The 39 WWII buildings may be demolished under the 1986 PA for WWII temporary buildings with no further consultation.
- The status of seven Cold War-era buildings over 50 years of age (Buildings 968, 1265, 546, 1275, 1277, 1279, and 1283) is unknown and requires evaluation for NRHP eligibility.
- Nineteen Cold War-era buildings under 50 years of age whose function was housing and base support are recommended ineligible for listing on the NRHP due to lack of exceptional importance.
- The status of nine Cold War-era buildings under 50 years of age (Buildings 419, 422, 425, 1352, 457, 458, 451, 474, and 1282) is unknown. Due to the potential for a direct association with a Cold War mission, these buildings may hold exceptional historical significance. Therefore, they require evaluation for NRHP eligibility and SHPO concurrence with the eligibility recommendation.
- Three buildings (Buildings 1127, 1016, and 266) were constructed after the Cold War. As resources under 50 years of age possessing no exceptional historical or architectural significance at the national level, these buildings require no evaluation.

3.3.8 Water Resources

3.3.8.1 Surface Water

Tyndall AFB is located on a peninsula surrounded by the East Bay/ Intracoastal Waterway to the east, the St. Andrews Sound, St. Andres Sound, and the Gulf of Mexico to the west (See Figure 1-1). The two bays have a confluence to the north. The East Bay is adjacent to the St. Andrews Sound and receives discharge from the Wetappo Creek, Horseshoe Creek, Sandy Creek, Mule Creeks, Calloway Creek, Fred Bayou, and Farmdale Bayou. The St. Andrews Sound discharges into the Gulf of Mexico after receiving waters from the East Bay and the North Bay. The Gulf of Mexico borders the western shoreline of Crooked Island, whereas the eastern shoreline is bordered by St. Andrews Sound (USGS 1988). Tyndall AFB has approximately 52 miles of shoreline.

Tyndall AFB discharges stormwater through seven outfalls. Five of the outfalls discharge runoff from airfields and adjacent areas and two outfalls discharge from industrial areas. Outfalls A and B are located north and north-northeast of the airfield and associated facilities. These outfalls receive water from approximately 416 acres associated with the airfield and associated facilities. These outfalls discharge to Fred Bayou, which discharges into the East Bay. Outfalls E and F also discharge to Fred Bayou. These outfalls receive water from 27 acres associated with the Fuel Storage Area and an industrial area located to the northwest of the airfield. These outfalls consist of a system of dikes that capture the stormwater prior to discharge. Outfall C is located on the eastern portion of Tyndall, which receives discharge from approximately 658 acres (40 percent of the acreage is impervious) from the eastern portion of the airfield. Outfall C discharges to the Little Cedar Bayou which in turn discharges to the East Bay. Outfall D is

located on the southeast portion of the base and receives discharge from the active airfield and discharges to the St. Andrews Sound. Outfall G is located at the eastern central area of Tyndall AFB, at the drone runway. This outfall receives overland and stormwater flow from 405 acres, 25 percent of which is impervious and discharges to the East Bay (DESC 2006).

Permitting for point and stormwater discharges has been delegated to the State of Florida by USEPA under the National Pollutant Discharge Elimination System (NPDES). Individual and general stormwater permits require the permittee to develop and implement a pollution prevention plan to monitor discharges for specific pollutants. Tyndall AFB holds a Multi-Sector General Permit (MSGP), Facility Identification Number FLR05C304, from the FDEP.

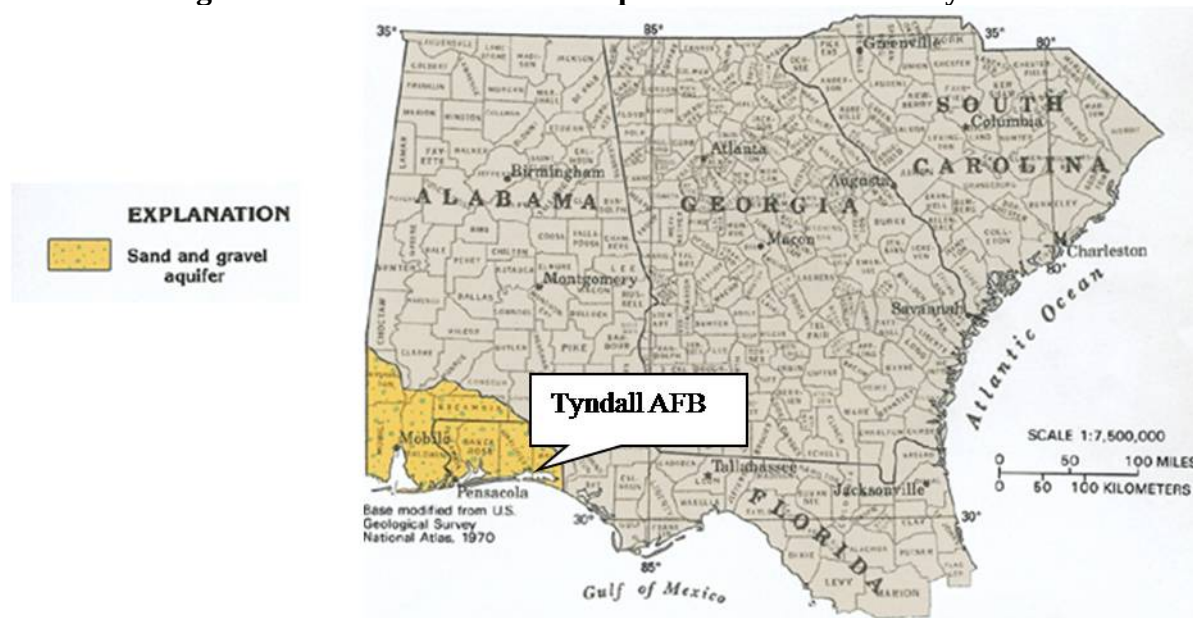
This permit allows Tyndall AFB to discharge stormwater associated with air transportation related activities into receiving surface waters. The permit requires monitoring of specific pollutants at outfalls, utilization of best management practices (BMPs), implementation of engineering controls to control runoff, training of on-site personnel, and illicit discharge detection and elimination. The BMPs, engineering controls, and a Stormwater Management Program are found within the base-wide SWPPP. Construction related activities and discharges located within Tyndall AFB are not authorized by the MSGP (USAF 2007c).

3.3.8.2 Groundwater

Tyndall AFB is located above the Floridan Aquifer System, specifically the Sand-and-Gravel Aquifer (Figure 3-10). The Sand-and-Gravel Aquifer occupies an area of approximately 6,500 square miles in southwestern Alabama and the western portion of the Florida panhandle. The groundwater within this aquifer flows towards the coast or streams, and is recharged by local precipitation. A small volume of groundwater is discharged to streams, small springs, and the Gulf of Mexico. Groundwater is located within unconfined conditions and where artesian conditions are present (USGS 1995).

The groundwater utilized by regional communities is withdrawn from the lowest of the two highly permeable zones within the aquifer. This zone is called the “Main Producing Zone,” and is recharged by percolation from the overlying zone. Groundwater is found close to the surface from 0 to 50 feet below surface (bgs). The groundwater withdrawn from this aquifer is utilized for domestic, industrial, mining, and thermoelectric power. The groundwater wells have a rate of production around 1,000 gallons per minute. The water obtained from the Sand-and-Gravel aquifer is considered to be suitable for drinking; however, high levels of dissolved iron concentrations are present. Given that the overlying zone is located close to the surface, the aquifer is susceptible to potential contamination (USGS 1995).

Figure 3-10 Sand-and-Gravel Aquifer and Location of Tyndall AFB



Source: USGS 1995

3.3.8.3 Floodplains

EO 11988, *Floodplain Management*, requires that federal agencies provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. Floodplains are present within Tyndall AFB. The coastal border and the east southeast portion of the installation are located within 100-year floodplains. The floodplain located along the coastline and is continuous and can extend up to 4,000 feet inland, following bayous and low-lying areas. The floodplain located within the east southeastern portion of the installation extends from the perimeter of the installation 3 miles to the west, three quarters of a mile west of Farmdale Bayou. Crooked Island and Shell Island are located entirely within 100-year floodplains. All areas within the 100-year floodplain have been designated as Special Flood Hazard Areas Inundated by 100-Year Flood (FEMA 2002). Special Flood Hazard Areas are areas in which there is a one percent chance of flooding to occur within any given year.

3.3.9 Hazardous Materials and Wastes

3.3.9.1 Hazardous Materials

Hazardous material use and management at Tyndall AFB are regulated under the Toxic Substance Control Act, Occupational Safety and Health Administration (OSHA), Emergency Planning and Community Right-to-Know Act, and Air Force Occupational Safety and Health Standards. The regulations require personnel using hazardous materials to be trained in the application, management, handling, and storage of material; know the location of material safety

data sheets (MSDSs) for all hazardous materials that they are using; and wear the correct personal protective equipment required for materials that are being used. Tyndall AFB has a Hazardous Material Emergency and Response Plan in place that documents management, measurement, and reporting goals in relation to hazardous materials located on Tyndall AFB and all associated property. A list of hazardous chemicals, including MSDSs used on-base are located in Hazmat Office (USAF 2006b).

Current operations at Tyndall AFB require the use of hazardous materials in varying quantities. Hazardous materials are used by military personnel and on-base contractors throughout the base. The location of hazardous materials, procedures and equipment at Tyndall AFB used to prevent and clean up a release, and actions to be taken in the event of a release are located in the Tyndall AFB Hazardous Material Emergency Planning and Response Plan and the Tyndall AFB Spill Prevention Control and Countermeasure Plan (USAF 2006b and DESC 2006).

Tyndall AFB has a Petroleum, Oil, and Lubricant (POL) Contamination Program on base with approximately 24 sites that are currently undergoing investigation to observe petroleum hydrocarbon contamination within soil and groundwater. The sites are under investigation by the 325th Environmental Flight Compliance Program, as directed by the State of Florida and Tyndall AFB's Petroleum Contamination Agreement.

3.3.9.1.1 Asbestos

Asbestos surveys have been conducted throughout Tyndall AFB. Tyndall AFB maintains the results of these surveys (USAF 2004). Asbestos-containing material (ACM) is potentially present in every facility that houses pipe insulation, cement pipe, floor tile, floor tile adhesive, roof-patching sealant, wall board in mechanical closets, wall and ceiling texture, and wall board panels. The *Tyndall AFB Asbestos Management Plan* is in effect and qualified contractors are hired to perform abatement and removal when necessary. The plan details procedures for notification, record keeping, protection, and abatement associated with ACM; it also ensures that Tyndall AFB is in compliance with all ACM related federal, state, and local regulations (USAF 2007d).

3.3.9.1.2 Lead-Based Paint

A lead-based paint (LBP) survey was conducted on Tyndall AFB in 1996. The survey was conducted on random facilities. Currently a case-by-case survey is conducted on facilities when those facilities are renovated or demolished. When a facility is slated to be either renovated or demolished, during the project-planning phase, the LBP Project Office must be informed and they will conduct a LBP survey (USAF 2007e). Tyndall AFB maintains the results of those surveys on a LBP Database. Tyndall AFB has a LBP Management Plan which establishes responsibilities, procedures for assessing risk, hazard management and risk reduction, medical screening, record keeping, waste disposal requirements, and provides guidance for the capture or removal of LBP scrapings or dust. Historic painting activities did not include capture and proper disposal of paint scrapings or dust; therefore, it is possible that the soil in areas where LBP was used may exhibit elevated concentrations of lead (USAF 2007e). Currently, families residing in Military Family Housing (MFH) are notified of the possible presence of LBP prior to taking occupancy (USAF 2004).

3.3.9.1.3 Pesticides

Pesticide application is routinely performed and managed by the Civil Engineering Squadron Operations Pest Management Base Operating Support contractor. The central bulk storage facility for pesticides is located at Building 1701, the Tyndall AFB Pest Management Shop. Commercially available pesticides and herbicides are applied as needed along roadways, fire breaks, and pre-determined locations (spot applications) throughout the installation. Application and use of these and all pesticides and herbicides is done in accordance with the Integrated Pest Management Plan (USAF 2004).

Historic pesticide applications, including diazinon, allethrin, chlordane, and pyrethrin-based products, have occurred throughout Tyndall AFB. These products were used within the appropriate guidelines for application at the time they were used. Historically, chlordane was injected beneath foundations of buildings when termite infestations were observed. Due to the persistence of chlordane in the environment, it is likely that concentrations of chlordane may be present in soils (USAF 2004).

Prior to the development of Tyndall AFB, the land on which the installation is located housed turpentine stills, seafood businesses, tourist establishments, and several small settlements. Given the past usage of the area, there is a potential for pesticide usage around these areas (USAF 2004).

3.3.9.2 Hazardous Waste

Hazardous wastes are defined by the Solid Waste Disposal Act as amended by RCRA, which was further amended by the Hazardous and Solid Waste Amendments, RCRA subtitle C (40 CFR, Parts 260 through 270). Hazardous wastes are defined as wastes with properties that are dangerous or potentially harmful to human health or the environment. Hazardous wastes are regulated by the USEPA. However, in Florida, the USEPA has delegated its hazardous waste regulatory authority to the State of Florida. Additionally, Tyndall AFB hazardous waste management is regulated under AFI 32-7013, *Hazardous Waste Management and Minimization*.

Hazardous waste regulations are implemented at Tyndall AFB through hazardous waste permitting procedures and the *Tyndall AFB Hazardous Waste Management Plan*. The plan details hazardous waste packaging, turn-in, transportation, storage, record keeping, and emergency procedures. Hazardous waste is generated at Tyndall AFB from vehicle, building, and equipment maintenance; spent hazardous materials; and spills. Air Force waste management operations at Tyndall AFB are registered with the USEPA under identification number FL1570024124 as a large-quantity generator (USAF 2007f).

Day-to-day operations at Tyndall AFB generate multiple types of hazardous wastes that require special handling and proper disposal. These include oils and fuels, cleaning compounds, paints, solvents, and batteries. Hazardous wastes are collected at two satellite accumulation points and are then transferred off base by a hazardous waste contractor, on a monthly basis (USAF 2004).

3.3.9.3 Environmental Restoration Program

The ERP was implemented by the DoD to identify and evaluate areas and constituents of concern from toxic and hazardous material disposal and spill sites. Once the areas and constituents had been identified, the ERP was tasked to remove the hazards in an environmentally responsible manner. All response actions are based upon provisions of CERCLA, and the *Superfund Amendments and Reauthorization Act of 1986* as clarified in 1991 by EO 12580, *Superfund Implementation*.

Tyndall AFB has a total of thirty eight ERP sites and one Area of Concern (AOC). Currently, the AOC and twenty three of the ERP sites are closed or pending closure with no further action required. Only four active ERP sites are located within one-half mile of all the proposed construction and demolition activities. Table 3-11 provides additional information about the ERP sites and has been summarized from the *ERP Management Action Plan* (USAF 2007g).

Three of the active ERP sites located within one-half mile of the proposed project sites, SS019, SS026, and LF005, are currently undergoing remedial actions. ERP site SS019, the Zone 4 Army and Air Force Exchange Service (AAFES) Service Station, involves contaminated groundwater. The site is currently being utilized for vehicle maintenance and fueling. Contact with the contaminant, gasoline, can occur if a maintenance or service station worker interacts with the groundwater located beneath the service station. The groundwater is found close to the surface. Remediation activities occurred on SS0019 from 1998 to 2000 by utilizing natural attention, and air sparging was conducted from 2004 to 2005. ERP Site SS026 is currently in use, and has been since the 1950s. The groundwater located under this site, found close to the surface, has been contaminated by a leaking diesel and gasoline underground storage tank. The contaminants include aluminum, benzene, iron, vinyl chloride, and trichloroethylene. Remediation activity at SS026 included air sparging from 2004 to 2007. LF005 was in use from 1945 to 1965, and was filled with machinery parts, batteries, and empty containers. The groundwater located under LF005 is contaminated with aluminum, iron, and manganese. A cap is currently being installed to decrease potential for any additional groundwater contamination, and to insure that the soil in the surrounding areas does not become contaminated.

The last site within one-half mile of the proposed construction sites, FR038, is currently undergoing remedial investigation. The site was a WWII Army Air Corps gunnery skeet range. The soils and groundwater located around and below the site are contaminated with benzo(a)pyrene and lead (USAF 2007g).

Table 3-11 Tyndall AFB Environmental Restoration Program – ERP Sites Located Within One-Half Mile of Proposed Construction Activities

Site ID	Site Name	Regulatory Phase	Description
SS019	Zone 4 AAFES Service Station	RA-O	The site is the main service station for Tyndall AFB. A gasoline leak occurred, resulting in an infiltration of gasoline into the storm sewers. Natural attention of the site occurred from 1998 to 2000, and an air sparging unit was installed and was operation from 2004 to 2005.
SS026	Vehicle Maintenance Area	ROD/DD	This site is has been in use since 1950s. The site includes a machine shop, paint shop, car wash, and gasoline dispensing facility. Contamination occurred when diesel and gasoline underground storage tanks began to leak. Groundwater has been contaminated. Air sparging is currently being utilized to remove the contamination.
LF005	Site 5 Zone 8 6000 Area Landfill	FS	This site consists of an unlined landfill that is approximately three acres in size. The landfill was in use from 1945 to 1965 and contains machinery parts, batteries, and empty containers. The groundwater beneath the site is contaminated with aluminum and iron. The landfill was capped by a clay liner in 2006
FR038	Beacon Beach Gunnery Activities Area	RI	The site is a former skeet range. Currently there is lead and benzo(a)pyrene contamination in both groundwater and soil. Currently there is no plan to remediate the contaminated soil and groundwater.
Notes: AAFES = Army and Air Force Exchange Service AFB = Air Force Base FS = Feasibility Study RA-O = Remedial Action Objective RI = Remedial Investigation ROD/DD = Record of Decision/Decision Document			

In addition to IRP sites, Tyndall AFB also has Military Munitions Response Program (MMRP) sites. The MMRP was established in 2001 to manage the environmental, health, and safety issues that could be created by unexploded ordinance, discarded military munitions, and munitions constituents. There are three MMRP sites located within one-half mile of the proposed construction and demolition activities. These sites are: SA180, SA181, and SR170. All of these sites are scheduled to undergo additional delineation during 2009. SA180 is the Former Munitions Storage Area. The area was in operation from 1941 to the 1960s and consisted of at least seven storage magazines and support buildings. The area was in use until a new munitions storage area was constructed, at which time all munitions were moved. SA181 is the Tower Range. Additional information on this site is unknown at the time of publication of this document. SR170 is the Stationary Target Range. This site is a possible shot and target drop area (Hamilton 2008).

3.3.10 Safety

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The elements of an accident-prone environment include the presence of a hazard and an exposed population at risk of encountering

the hazard. Numerous approaches are available to manage the operational environment to improve safety, including reducing the magnitude of a hazard or reducing the probability of encountering the hazard. The primary safety categories discussed in this analysis include Ground and Traffic Safety and Construction and Demolition Safety.

3.3.10.1 Ground and Traffic Safety

This section includes activities associated with ongoing operational, sports and recreation, and other activities that are associated with vehicle usage/traffic safety issues on base. Factors involving primary occupational safety and health issues are addressed in the Occupational Safety and Health Act and Air Force Occupational Safety and Health Standards. All day-to-day operations and maintenance activities on Tyndall AFB are performed by trained, qualified personnel in accordance with applicable equipment technical directives, approved occupational safety and health standards, and sound maintenance practices. The handling, processing, storage, and disposal of hazardous byproducts resulting from construction, demolition, operations, and maintenance are accomplished in accordance with the federal and state requirements applicable to each substance. Both natural and man-made environmental hazards may be present on base at any time due to the varied activities that take place at Tyndall AFB. Naturally-occurring potential health and safety hazards include insects, snakes, climactic conditions, and flash floods. Potential man-made health and safety hazards include general injuries due to outdoor physical training activities and both on- and off-base motor vehicle accidents.

According to the FY2007 safety statistics provided by Tyndall AFB, there were 12 total on-duty mishaps and 19 total off-duty mishaps recorded. Mishaps recorded on-duty included industrial and miscellaneous incidents. Mishaps recorded from off-duty incidents included motorcycle mishaps, sports and recreation, 4-wheel vehicle, and miscellaneous mishaps. There were no recorded fire incidents in FY2007 (USAF 2007h).

Because the Proposed Action and alternatives would not involve any changes to current weapons/explosives operations at Tyndall AFB, safety in these areas of operation was not outlined in this section.

3.3.10.2 Construction and Demolition Safety

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees, and implementation of operational practices that reduce risk of illness, injury, death, and property damage. The health and safety of on-site military and civilian workers are safeguarded by numerous DoD and Air Force regulations designed to comply with OSHA standards. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors. Historic construction and demolition mishap data was not available for Tyndall AFB at the time of this analysis.

3.3.11 Infrastructure and Utilities

Infrastructure and utilities on Tyndall AFB consist of potable water, sanitary sewer, solid waste, drainage, transportation, and electricity/natural gas. These services are required and utilized on a

daily basis by the on-base population. Utilities on Tyndall AFB are provided by off-base suppliers.

To determine the current and future utilization of these services, historical data is reviewed and compared to an effective population. The effective population determines the number of people who utilize a service per 24-hour day, by factoring in the number of on-base and off-base personnel. Under this metric, Tyndall AFB personnel who live off-base are weighted by a factor of one-third to represent their average eight-hour per day demand on installation utilities. By calculation, Tyndall AFB currently has an effective population of 4,759 (Table 3-12). To determine the per capita usage of a utility, the historical data is reviewed (i.e., annual usage of potable water) and then divided by the effective population. The number generated is the annual per capita usage of that utility. When utilizing an effective population to determine utility usage statistics, it must be noted that the historical usage numbers include all domestic, industrial, commercial, and public use. Including these types of usages creates a higher value and does not represent an actual “per person” consumption rate for the installation.

Table 3-12 Tyndall AFB Effective Population

Category	Population	Effective Population Factor	Effective Population
On-base Personnel (24-hr population)	2,398	1.00	2,398
Off-base Personnel ⁽¹⁾ (8-hr population)	7,155	0.33	2,361
Total	9,553	--	4,759
Notes: ⁽¹⁾ Military Dependents and Military Retirees residing off base are not included in the 8-hr population for the installation. hr – hour			

3.3.11.1 Potable Water

The majority of Tyndall AFB’s potable water is purchased from Bay County. The source of this potable water is Deer Point Lake (USAF 2004). Water is conveyed toward the main base across Dupont Bridge via a single pipeline that feeds a five-million-gallon storage tank owned and operated by Bay County. The storage tank discharges to a distribution main to which the base connects at three metered locations along US Highway 98. Each meter is 8 inches in diameter (USAF 2008b). The design system capacity at Tyndall AFB is based on water flowing full through three, 8-inch water meters that convey water to the base from the county's distribution system. The maximum capacity through these three meters is approximately 3.81 million gallons per day (MGD); however, Bay County limits the installation’s usage to 3.024 MGD. In 2007, Tyndall AFB consumed, on average, approximately 0.97 MGD of potable water. Using the effective population, as stated in Table 3-11, the daily per capita potable water consumption in FY07 was 203.8 gallons per day (gpd). The annual consumption rate is approximately 25 percent of the potable water distribution system’s capacity and 32 percent of Bay County’s water allotment (USAF 2008b).

Peak water usage, or the sum of peak usage and fire demand, is approximately 2.21 MGD. Even at peak water usage, the installation is only at 58 percent of the system's capacity and 73 percent of the installation's usage capacity.

The natural infrastructure measures for water supply at Tyndall AFB shows that Tyndall AFB is expected to continue to provide for a high level of mission opportunity (USAF 2008b).

3.3.11.2 Sanitary Sewer

Most of the sanitary sewer system at Tyndall AFB is 50 years old or more and is constructed of vitrified clay, some asbestos, steel, and polyvinyl chloride pipes. Tyndall AFB has 70 miles of sanitary sewage mains. Currently the sewer mains are in poor condition and recommendations for replacement have been made. Sanitary sewage collected at Tyndall AFB is treated at Bay County's Advanced Wastewater Treatment Plant (AWTP), and the Bay County industrial sewage lagoon. Both of these treatment areas are located within the Tyndall AFB boundary (USAF 2004). The AWTP is permitted for 7.0 million gallons of sewage per day and provides service to an estimated 45,000 people. It is unknown how much wastewater is generated from Tyndall AFB. Currently, the AWTP receives an average daily discharge of 583,940 gallons. Therefore, the AWTP currently operates at approximately 8 percent of its capacity. Based on the service population of 45,000, this translates to an average of 13 gallons per capita of daily wastewater generation. At peak demand, the installation discharges approximately 1.6 million gallons per day, or 24% of the AWTP's capacity (USAF 2008b).

Tyndall AFB previously had a sewage treatment plant; however, construction of the AWTP has eliminated its need. Tyndall's Sewage Treatment plant has been refitted as a lift station and pumps sewage from Tyndall to the AWTP (USAF 2004).

3.3.11.3 Solid Waste

Non-hazardous solid waste is collected by contract and disposed of off-base. Tyndall AFB does not operate any on-base landfills, but does conduct a base-wide recycling program. The recycling program includes collection points for glass, plastic, paper, newspaper, and cardboard around the base. The county does not recycle solid waste, but does operate a waste-to-energy incinerator that uses trash from Tyndall AFB and other communities. Remaining ash from the incinerator is then disposed at the Steelfield Landfill, approximately 40 miles northwest of Tyndall AFB. The landfill currently receives approximately 300 tons per day of solid waste, including construction and demolition waste, and has a life expectancy of 42 years (Waste Map Florida 2008).

Municipal solid waste management and compliance guidance at Air Force installations is established in AFI 32-7042, *Solid and Hazardous Waste Compliance*. AFI 32-7042 incorporates by reference the requirements of RCRA Subtitle D and all other applicable federal regulations, AFIs, and DoD directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and recycling of solid waste, as addressed in AFI 32-7080, *Pollution Prevention Program*.

In FY2008, Tyndall AFB disposed of 804 tons of construction and demolition waste to the Steelfield Landfill. Additionally, the installation disposed of 1,919 tons of solid waste to the Bay County waste-to-energy incinerator. Based on the effective population of 4,759, this translates to 806 pounds per capita of daily solid waste generation. Tyndall AFB also recycled approximately 1,400 tons and reused 75,000 tons of material in FY2008 (McLellan 2008). This equates to a diversion rate of 96 percent.

3.3.11.4 Drainage

Tyndall AFB has an extensive stormwater piping network. There are seven permitted storm drainage points at Tyndall AFB, the majority of which are dispersed around the flightline (USAF 2004). The stormwater collection system serves a variety of facilities including aircraft hangars, aircraft parking ramps, runways, fuels dispensing and storage, washracks, maintenance shops, warehouses, and wastewater treatment facilities (USAF 2007c).

Four outfalls discharge into Shoal Point Bayou, which is located to the northwest of Tyndall AFB. One outfall discharges into Little Cedar Bayou, located northeast of the installation; one outfall discharges into St. Andrew Sound located to the south of the installation; and one outfall discharges into East Bay, located to the northeast of Tyndall AFB (USAF 2007c). Eventually, all stormwater from Tyndall AFB discharges to the Gulf of Mexico. Neither water body is degraded or on the USEPA 303(d) list of impaired water bodies. For the last three years, all stormwater capacity requirements were met on Tyndall AFB. In general, no issues such as significant erosion, flooding, stormwater overflows, or system failures were reported that hindered Tyndall AFB's ability to perform its mission (USAF 2008b).

Tyndall AFB is currently permitted under the State of Florida, FDEP NPDES Multi-Sector General Permit Number FLR05C304. Under this permit, there are no analytical requirements for Tyndall AFB. Specific base efforts to reduce stormwater pollution are documented in the base MSGP SWPPP. Other on-base operations are covered by the Draft NPDES Phase II Municipal Separate Storm Sewer System General Permit No. FLR04E004 Stormwater Management Program (USAF 2008b).

3.3.11.5 Transportation

US Highway 98 bisects Tyndall AFB and serves as the primary artery of the installation's transportation system. Tyndall AFB has approximately 98 miles of roads. A grid street pattern adequately serves the industrial and operational areas north of US Highway 98. The primary roads on the north are Tyndall Drive and Florida Avenue. The curvilinear road system south of US Highway 98 was established in 1941. The primary roads in this area are Illinois Avenue, Beacon Beach Road, Sabre Drive, and the loop comprised of Mississippi Road and Suwannee Avenue. At the core of the loop road system is the Community Center Area. The condition of the installation pavements is structurally sound (USAF 2004).

Nine gates provide access to the installation - the Cleveland Gate, Sabre Gate and Visitors Center, Dixie Gate, Tyndall Gate, WEG Gate, AFCESA Gate, Louisiana Gate, and Illinois Gate. Currently, access to Tyndall AFB to the north of US Highway 98 is via Tyndall Gate, while

access to property south of the highway is provided by the Sabre and Illinois Gates. The Sabre Gate also provides direct access to the family housing areas (USAF 2004).

The most recent traffic study of the area was conducted by BKM Architects in 2003. The traffic study recommended improvements to the Sabre Drive, Tyndall/Illinois, Louisiana, and WEG Gates, as well as, construction of an overpass and improvements to Mall Area and Research Road. Gate improvements were recommended to increase traffic flow into and out of the installation. The overpass recommendation would provide direct access between both sides of Tyndall AFB, thereby minimizing unnecessary security identification checks and improving the level of service in the entire base transportation network. It would also minimize delays at the Tyndall Drive and Illinois Avenue gates thus relieving congestion and backups at the gates. Mall Area changes were recommended to improve geometric problems with the main driveway into the mall. Finally, improvements to Research Road were recommended to help decrease likelihood of vehicular accidents. No comprehensive traffic studies have been conducted since 2003 (USAF 2003).

3.3.11.6 Electricity and Natural Gas

Gulf Power Company distributes electricity to Tyndall AFB. Currently, approximately 90 percent of the electrical system is overhead and 10 percent of the system is underground (USAF 2004).

Natural gas is provided to Tyndall AFB through the Defense Energy Supply Center contract and transported by Florida Gas Transmission to the local utility. The gas is delivered to Tyndall AFB by the local utility, Peoples Gas (TECO), through local transmission lines. Gas distribution piping is mostly steel and replaced sections are polyethylene. Piping size varies from 3/4 to 6 inches. The system has been rated in good condition (USAF 2004).

Electrical consumption for FY2008 was 126,415 Megawatt-hours (MWh). The average daily rate of electrical usage was 346 MWh per day and based on an effective population of 4,759, this translates into a per capita daily electrical consumption rate of 0.07 MWh (USAF 2008c). According to Gulf Power Company, there are currently no electricity capacity restraints that would inhibit growth at Tyndall AFB (Aycok 2008).

Natural gas consumption for FY2008 was 97,391 thousand cubic feet (kcf), 267 kcf per day, or 0.06 kcf per day per capita (USAF 2008d). According to TECO, there are currently no natural gas capacity restraints that would inhibit Tyndall AFB's growth (McGuire 2008).

3.3.12 Socioeconomic Resources

Tyndall AFB is located on the Florida Panhandle along the Gulf of Mexico approximately 13 miles east of Panama City and 8 miles east of Springfield (USAF 2008e). The socioeconomic status of Tyndall AFB and the region are addressed in this section. The scope of this section includes population, housing, education, and economic activity.

3.3.12.1 Population

In 2000, an estimated 36,417, or 24.6 percent of the Bay County population, resided in the City of Panama City, with an average family size of 2.92 (USCB 2008a). The 2007 estimated population of Panama City was 36,805; this was an increase from the 2000 estimated population of 36,417 (USCB 2008b). Panama City, which is located entirely within Bay County, experienced a slower growth rate from 1990 to 2000 compared to Bay County (USCB 2008c). For Panama City, the 2000 population estimate of 36,417 represents an increase of 5.9 percent over a ten year period, whereas the growth of Bay County between 1990 and 2000 was 16.7 percent (USCB 2008a, USCB 2008c). The population growth for the state of Florida from 1990 to 2000 was approximately 23.5 percent and the nationwide population growth was 13.1 percent (USCB 2008a, USCB 2008c). The projected growth for Bay County from 2007 to 2014 is 8.5 percent, or a 14,355 person increase (CHARTS 2008).

Based on the 2008 Tyndall AFB General Plan-Based Environmental Impact Analysis Process Capability Analysis there are 762 military personnel living on base and 4,580 living off base. There are 1,634 active-duty military dependents living on base and 3,649 off-base, active-duty military dependents. The total on-base population at Tyndall AFB is 13,202 personnel, which includes military personnel (living on and off base), dependents, private business, and civilian personnel (USAF 2008b).

3.3.12.2 Housing

The Tyndall AFB Housing Requirements and Market Analysis (HRMA) for 2007 defines the housing market area as covering a 60-minute commute, or 20 miles, in private vehicles and assuming peak traffic conditions from Tyndall AFB's headquarters building or major work centers. The Tyndall AFB housing market area includes most of Bay County except the northeastern corner and the western edge of the county along the Gulf Coast; a large portion of Gulf County including Mexico Beach and along US Highway 98 south through Port St. Joe and Apalachicola, which is located in Franklin County; a small portion of the southern and southeastern corner of Washington County; and the westernmost portion of Calhoun County. The HRMA analyzes data from 2006 and makes projections through 2011. In 2006, there were projected to be 20,688 rental units within the housing market area. The rental supply is expected to reach 22,455 units by 2011. According to the 2006 HRMA, of the 20,688 rental units, 6,292 units (30.4 percent) were considered to be unsuitable by Air Force standards. Of the remaining 14,396 suitable rental units, an estimated 13,568 were occupied and 828 were vacant (USAF 2007i). As reported in the 2008 Tyndall AFB Capability Analysis, there are 817 privatized MFH units on Tyndall AFB (USAF 2008f).

Considering conceptual future housing capacity associated with land development, as well as planned construction, demolition, and renovation activities associated with MFH privatization, Tyndall AFB has the future capacity to accommodate 4,803 on-base military personnel and dependents (USAF 2008f).

3.3.12.3 Education

Children who live in permanent quarters on Tyndall AFB, as well as those living off base in Panama City, attend schools with Bay District Schools.

Bay District Schools is made up of 39 schools that serve to educate pre-kindergarten through 12th grade students. This includes 19 elementary schools, one kindergarten through 12th grade school, six middle schools, six high schools, two alternative schools, two special purpose schools, and three charter schools. According to the FY2008-2009 Bay District Schools Final Annual Budget report, 25,152 students attend school within the district. The district has a student population consisting of the following background: 15.4 percent African-American, 0.43 percent American-Indian/Alaskan Native, 2.0 percent Asian Pacific Islander, 74.2 percent Caucasian, 3.8 percent Hispanic, and 4.2 percent multi-racial (Bay District Schools 2008). It is assumed that the majority of elementary age children living on Tyndall AFB are enrolled at Tyndall Elementary School, located on the installation. Older students living on base are likely enrolled at Rosenwald Middle School and Rutherford High School. Currently, the enrollment at Tyndall Elementary School is 770 students with a capacity of 784 (Ross 2008). The enrollment at Rosenwald Middle School is 737 students with a capacity of 833, and the enrollment at Rutherford High School is 1,500 students with a capacity of 1,900 (Rivers 2008 and Shaw 2008).

3.3.12.4 Economy

Tyndall AFB Economic Activity and Contribution. The following information is summarized from the 2007 Tyndall AFB Economic Impact Analysis (USAF 2008g).

Tyndall AFB generates economic activity in the region through employee payrolls, service contracts, construction programs, and other expenditures. The approximate 2007 payroll for military personnel (including active duty, Air National Guard/reservists, Traditional Guard/reservist, and military trainees) living on base was 23 million dollars and 222.6 million dollars for those living off base. The total 2007 payroll for both military and civilians was approximately 291.3 million dollars. Annual expenditures for service contracts, other services, material/supplies, base exchange, health care, education, and temporary duty were approximately 240.1 million dollars. Construction program costs, including funds for military construction programs, MFH, and operations and maintenance, totaled 6.4 million dollars. The number of on-base jobs, including both military and civilian, was 7,940, and other jobs created indirectly was calculated to be 2,565 resulting in a total value of 83.1 million dollars in created jobs. Thus, the cumulative, direct, annual economic impact of Tyndall AFB in 2007 was estimated to be 630.7 million dollars (payroll 48 percent, expenditures 39 percent, and estimated value of jobs created is 13 percent) (USAF 2008g).

Regional Employment and Income. According to the US Census Bureau 2000 census, per capita personal income in Panama City was 21.1 percent lower than the US average (USCB 2008d and USCB 2008e). In 2000, the Panama City unemployment rate was 3.1 percent, which was nearly equal to the state average for that period (3.2 percent) and slightly lower than the US average (3.7 percent) (USCB 2008d, USCB 2008e, and USCB 2008f). In Panama City, the leading non-governmental industries from 2005 to 2007 were education, health, and social services (26.1 percent of the working civilian population); retail trade (13.5 percent of the working civilian

population); construction (11.4 percent of the working civilian population); and professional, scientific, management, administrative, and waste management services (10.3 percent of the working civilian population). An estimated 19.6 percent of the total labor force in Panama City work for federal, state, or local governments (USCB 2008g).

3.3.13 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, provides that “each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” In an accompanying Presidential memorandum, the President specified that federal agencies shall analyze the environmental effects of their proposed actions on minority and low-income communities, including human health, economic, and social effects when such analysis is required by NEPA.

This analysis follows the *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process*, November 1997, and the CEQ Environmental Justice Guidance under NEPA, December 1997.

In order to determine if minority and low-income populations are disproportionately impacted by the Proposed Action or alternatives, two areas of comparison must first be determined:

- the area potentially affected by impacts from resources or ROI (i.e., air quality, noise, land use), and
- the larger regional community that includes the affected area and serves as a Community of Comparison (COC).

Depending on the Proposed Action or alternatives, each resource (i.e., air quality, noise, land use) can impact a different ROI. The ROI is the geographic area that would be adversely affected by a resource as a result of the proposed project. The ROI for this environmental justice analysis is the area within the boundaries of Tyndall AFB and Panama City. Since there is no demographic data available for Tyndall AFB and there are no minority or low-income populations present at Tyndall AFB, Panama City will serve as the ROI and its demographic data will be used for this analysis. The COC is the regional area surrounding the ROI that is the demographic area used to compare and analyze the potential environmental justice impacts that results in the identification of an environmental justice community. For this analysis the COC is the Bay County.

Disadvantaged groups within the ROI and COC, including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. For the purposes of this analysis, disadvantaged groups are defined as follows:

- **Minority Population:** Black or African Americans; American Indians and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race. For the 2000 Census, race and Hispanic origin (ethnicity) were considered two separate concepts and were recorded separately. For the purposes of this analysis, the total minority race population will be separate from the total Hispanic population to determine total minority race population from the Hispanic total within the affected areas.
- **Low-Income Population:** Persons living below the poverty level, according to income data collected in US Census 2000.

Tyndall AFB is located in Bay County, on the Florida Panhandle along the Gulf of Mexico approximately 13 miles east of Panama City. In the year 2000, the population of Panama City was 36,417. Caucasians represented 73.6 percent of the population, minorities represented 24.5 percent of the total population, and Hispanics or Latinos represented 2.9 percent of the total population (USCB 2009a).

Census data for the year 2000 showed the population for Bay County as being 148,217. Caucasians represented 84.2 percent of the population, minorities represented 13.9 percent of the total population, and Hispanics or Latinos represented 2.4 percent (USCB 2009a).

Based on the 2000 Census data, the incidence of persons in Panama City with incomes below the poverty level was 17.2 percent compared to 13 percent in Bay County (USCB 2009b and 2009c). Nationally, 12.4 percent of the population lives below the poverty level (USCB 2009d).

In 2000, the total population of the US was 281,421,906. Minorities represented 22.4 percent of the population with 12.3 percent Black or African American; 0.8 percent American Indian and Alaskan Native; 3.6 percent Asian; 0.1 percent Native Hawaiian and Other Pacific Islander; and 5.5 percent some other race. A Hispanic or Latino ethnicity was reported by 12.5 percent of the population (USCB 2009a).

Table 3-13 summarizes census data on minority and low-income populations for Panama City and Bay County. Additional information is provided for the state of Florida and the US.

Table 3-13 Percent Minority and Low Income Populations

Demographic Area	Total Population	Total Hispanic/Latino Population	Percent Hispanic/Latino	Total Minority Race Population ^a	Percent Minority Race	All Income Levels ^b	Total Low-Income Population	Percent Low Income
Panama City	36,417	1,060	2.9	8,910	24.5	34,117	5,875	17.2
Bay County	148,217	3,591	2.4	20,587	13.9	144,747	18,882	13.0
State of Florida	15,982,378	2,682,715	16.8	3,141,034	19.7	15,605,367	1,952,629	12.5
United States	281,421,906	35,305,818	12.5	63,135,052	22.4	273,882,232	33,899,812	12.4
Source: USCB 2009a-2009e								
Notes:								
^a Minority Race includes Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race.								
^b All income levels includes everyone except those in institutions, military group quarters, and college dormitories, and unrelated individuals under 15 years old.								

At least one criteria listed below must be met to determine if an environmental justice population is present:

- If the affected area's percentage of minority or low-income population is greater than that of the general population, the affected area is considered to be a minority or low-income population.
- If the minority population (including Hispanics or Latinos) or low-income population is greater than 50 percent, it is considered a majority-minority or majority low-income population.

Based on the criteria above, there is a minority and low-income population present within the area that would be impacted by construction and demolition activities.

Chapter 4

Environmental Consequences

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential environmental impacts that are likely to occur as a result of implementation of the proposed or alternative actions. The No-action Alternative provides a baseline against which the impacts of the proposed and alternative actions can be compared. A discussion of measures designed to minimize potential impacts is included, as necessary. Any resultant irreversible or irretrievable commitments of resources are also noted. Criteria and assumptions used to evaluate potential impacts are discussed in each section.

4.2 CHANGE IN CURRENT MISSION

The activities associated with the proposed or alternative actions would not change the current mission of Tyndall AFB, but would continue to support, and in some areas, increase the current mission of the installation.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 Airspace Use and Management

A significant impact to airspace management and use could occur if the proposed action or alternative: 1) changes operations within airspace already designated for other purposes, 2) results in a need to designate controlled airspace where none previously existed, 3) results in a reclassification of controlled airspace from a less restrictive to a more restrictive classification, 4) restricts movement of other air traffic in the area, 5) conflicts with air traffic control in the region, or 6) results in a need to designate regulatory special use airspace.

4.3.1.1 Proposed Action

Under this alternative, flight operations would not be increased from the baseline setting described in Section 3.3 (Airspace Use and Management). Sorties would be generated at approximately the current rates and airfield operations would generally fall within the current levels of activity. Utilization rates for the SUA associated with Tyndall AFB would not change appreciably. No changes to SUA dimensions are proposed under this alternative. Therefore, there would be no impacts to airspace use and management as a result of the Proposed Action.

4.3.1.2 No-action Alternative

Under this alternative, flight operations would not be increased from the baseline setting described in Section 3.3 (Airspace Use and Management). Therefore, there would be no impacts to airspace use and management as a result of the No-action Alternative.

4.3.1.3 Potential Development Alternative

The PDA would not change operations within airspace already designated for other purposes as the action occurs in airspace designated for the purpose of Tyndall AFB flight operations. In addition, the PDA would not result in a need to designate controlled airspace where none previously existed nor would result in the reclassification of controlled airspace from a less restrictive to a more restrictive classification. Under the PDA, aircraft operations would increase by 60 percent. While notable, this level of activity would not require expansion of Tyndall AFB's Class D airspace nor would it be sufficient to make the airspace surrounding Tyndall AFB or Panama City Bay County International a candidate for Class C airspace, largely because that classification is primarily intended for air carrier airports emplaning over 250,000 passengers. The criteria for establishment and maintenance of the existing Tyndall Class D airspace are based on containing IFR arrival operations between the surface to 1,000 feet AGL and IFR departure operations to the floor of adjacent controlled airspace (FAA 2008c).

The PDA would not unduly restrict the movement of other air traffic in the area or create any conflicts with air traffic control in the region. This area of Florida has a moderate population density. Consequently, the level of civil aviation activity is fairly high compared to other regions of the country. Along the Gulf Coast, however, the airfield and airspace are somewhat separated from other more intense regions, especially when compared to the concentration of air traffic in the vicinity of Naval Air Station Pensacola and Eglin AFB. The fact that the Tyndall RAPCON assigns training airspace units and controls all IFR traffic (civil and military) within the Class E airspace in the vicinity of Tyndall AFB allows it to reduce conflicts, sequence civil users into Panama City Bay County International Airport, and use SUA for IFR traffic when it is not otherwise in use. This is often not the case in other parts of the country where a lack of good radar coverage and communications with the using agency prevents ATC from using SUA when it is active.

Aircraft operations under the PDA are not expected to require expansion of the MOAs or require additional regulatory special use airspace (i.e. a Restricted or Prohibited area). Civil users operating under IFR may notice an increase in MOA utilization; however, the utilization rates are relatively high already. To the extent that this does occur, civil users operating under IFR to Panama City Bay County International Airport would continue to use the EBRO and CLARKS Departure/Arrival Transition Areas through the Tyndall B, D, E, and H MOAs; the level of IFR traffic into Panama City Bay County International Airport is not such that delays and holding would be expected. Also, the training and WSEP missions occurring at Tyndall AFB are largely daylight and fair weather operations so during periods of low visibilities and ceilings (i.e. IFR conditions) many sorties are cancelled and the airspace becomes available for use by civil users.

4.3.1.4 Measures to Reduce Impacts

No actions to mitigate the effects from the PDA on airspace use and management are proposed nor would be necessary as a result of a potential 60 percent increase to flight operations. Existing air traffic control procedures are adequate to the task of providing aircraft separation services to participating users. Additionally, the Air Force proactively engages in a program of public outreach to aviators, publishing Mid-Air Collision Avoidance (MACA) guides at its bases, including Tyndall AFB. These brochures, distributed to fixed base operators at nearby

airports, are primarily intended for pilots operating under VFR. The MACA contains information on preferred flight tracks, operational characteristics of high-performance military aircraft, and, points of contact to ascertain real-time status of SUA. Further, the FAA has an ongoing effort to provide real-time SUA status online so pilots of non-participating aircraft can factor anticipated SUA usage and availability into their flight planning, minimizing unnecessary avoidance of inactive SUA.

4.3.2 Noise

When evaluating noise effects, several aspects are examined, including: 1) the degree to which noise levels generated by training and operations, as well as ongoing construction, demolition, and renovation activities are higher than the ambient noise levels; 2) the degree to which there is hearing loss and/or annoyance; and 3) the proximity of noise-sensitive receptors (i.e., residences) to the noise source. An environmental analysis of noise includes the potential effects on the local population. Such an analysis estimates the extent and magnitude of the noise generated by the proposed and alternative actions. For purposes of analysis of aircraft operations at Tyndall AFB, impacts could be considered significant if the Proposed Action or alternatives resulted in a 3 dB DNL increase in noise exposure at a sensitive receptor. In addition, based on AICUZ guidance, land use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB DNL. As such, this can also provide an indicator as to when impacts could be considered significant.

4.3.2.1 Proposed Action

Implementation of the Proposed Action includes no increase to sortie counts or aircraft operations. Flight operations would generally be of the quantities and intensities of present conditions. While it should be noted that aircraft operations counts can and do fluctuate from year to year, it is anticipated that their level at any given time generally approximates current levels of activity as documented in the installation's 2007 AICUZ study.

Demolition and construction activities would occur as previously described in Table 2-2.

Aircraft Operations

Under the Proposed Action, flight operations would not change; therefore, the potential impacts to noise from flying operations would be unchanged from baseline conditions as described in Section 3.4.1. The predicted amount of land exposed to noise levels greater than 65 dBA DNL would be as presented in Table 3-3.

Construction Activities

As noted in Section 3.4, noise associated with construction activities does not typically generate a predicted noise exposure of 65 dBA DNL or greater because even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year it would produce a 65 dBA DNL. The nature of sound is such that the temporary noise effects from the operation of construction equipment are minor in comparison to the existing noise exposure from aircraft noise. In essence, the aircraft noise masks the noise from construction equipment, or stated another way, the overall contribution to the cumulative noise exposure from

construction noise is small compared to the existing noise environment created by the operation of aircraft.

Since the contribution to the DNL by construction generated noise would be minimal (<64 dB DNL) and the location of construction equipment is unknown, it is not possible to determine whether operation of said equipment would cause the existing DNL contours to shift. Therefore, a detailed analysis of construction noise is not performed in this assessment. However, it is foreseeable that increased noise from construction activities may temporarily occur as a result of the Proposed Action. It would result from activities inherent in construction and demolition. These activities would produce noise generated by heavy equipment and vehicles involved in demolition, site preparation, foundation preparation, construction, and finishing work. There would be a possibility of short-term, localized speech interference or annoyance near construction zones. In addition, adherence to standard Air Force Occupational Safety and Health regulations minimizes the risk of hearing loss to construction workers. These regulations require hearing protection along with other personal protective equipment and safety training.

Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the renovation project; therefore, an extended disruption of normal activities is not anticipated. Overall, impacts associated with construction noise would not be significant.

4.3.2.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline flight operations as described in Section 3.3.1.2.

4.3.2.3 Potential Development Alternative

If this alternative were selected and implemented, total flight operations would increase by 60 percent from 114,311 to 182,897 annually. As depicted in Table 2-3, the Air Force would increase F-15 *Eagle* flying operations by 60 percent from approximately 62,752 per year in FY2007 to 100,404 in FY2012. Operations of the F-22 *Raptor* would also increase by 60 percent from approximately 31,728 per year in FY2007 to 50,764 annual operations in FY2012. MU-2 *Marquise* and Aero Club operations would increase a corresponding percentage as well.

Demolition and construction activities would occur as previously described in Table 2-5.

Aircraft Operations

As noted in Section 3.4.1, the DNL is the preferred metric for assessing the impacts to the noise environment from aircraft operations. The DoD AICUZ program sets 65 dB DNL as the threshold for land use planning purposes (see Section 3.4.3) because it correlates reasonably well with a rapid increase of the percentage of persons annoyed from noise.

Under the PDA, the noise contours would extend further outward along all axes. The contours lengthen somewhat more than they widen (viewed along and about the northwest/southeast axis of the primary runway centerlines and extensions), consistent with an increase in operations over a given point on the ground as opposed to an increase in intensity or loudness of the same number of aircraft, in which case the contours widen. However, the vast majority of this

increase would occur over water, given the installation's proximity to the Gulf of Mexico and to St. Andrew Bay. Figure 4-1 shows the predicted noise exposure (noise contours) that would be expected if the PDA were implemented. A comparison of the baseline (FY2007) and PDA predicted noise exposure contours is shown in Figure 4-2.

The resultant predicted noise exposure of 114,000 annual aircraft operations for the mix of aircraft found at Tyndall AFB is shown as a set of noise contours that are centered about the runways. Table 4-1 details the baseline and PDA acreage present within each noise contour. Table 4-2 details the off-base (excluding water) baseline and PDA acreage present within each noise contour.

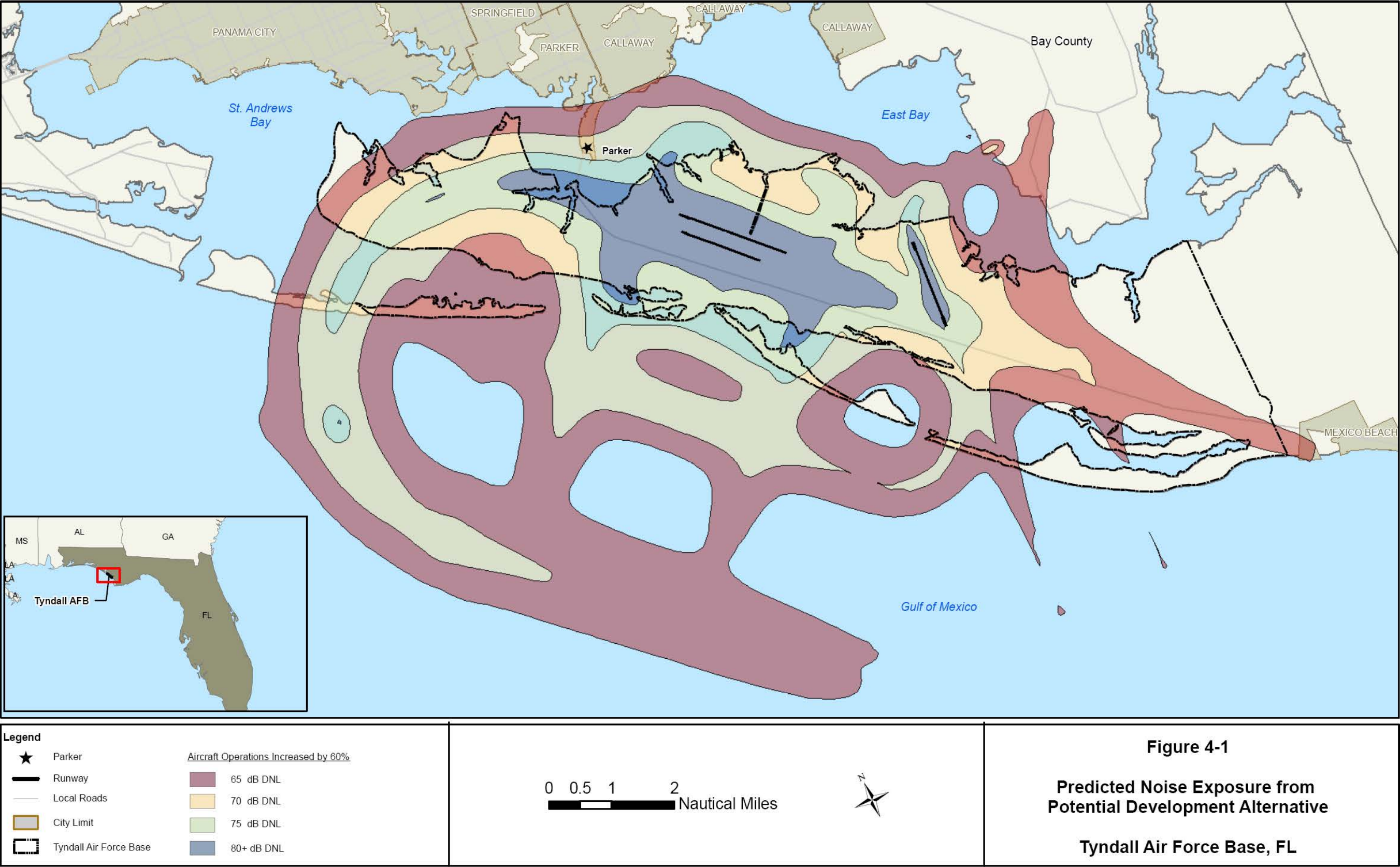
Table 4-1 Comparison of Land Area Exposed to Elevated Noise Levels (On Base and Excluding Water)

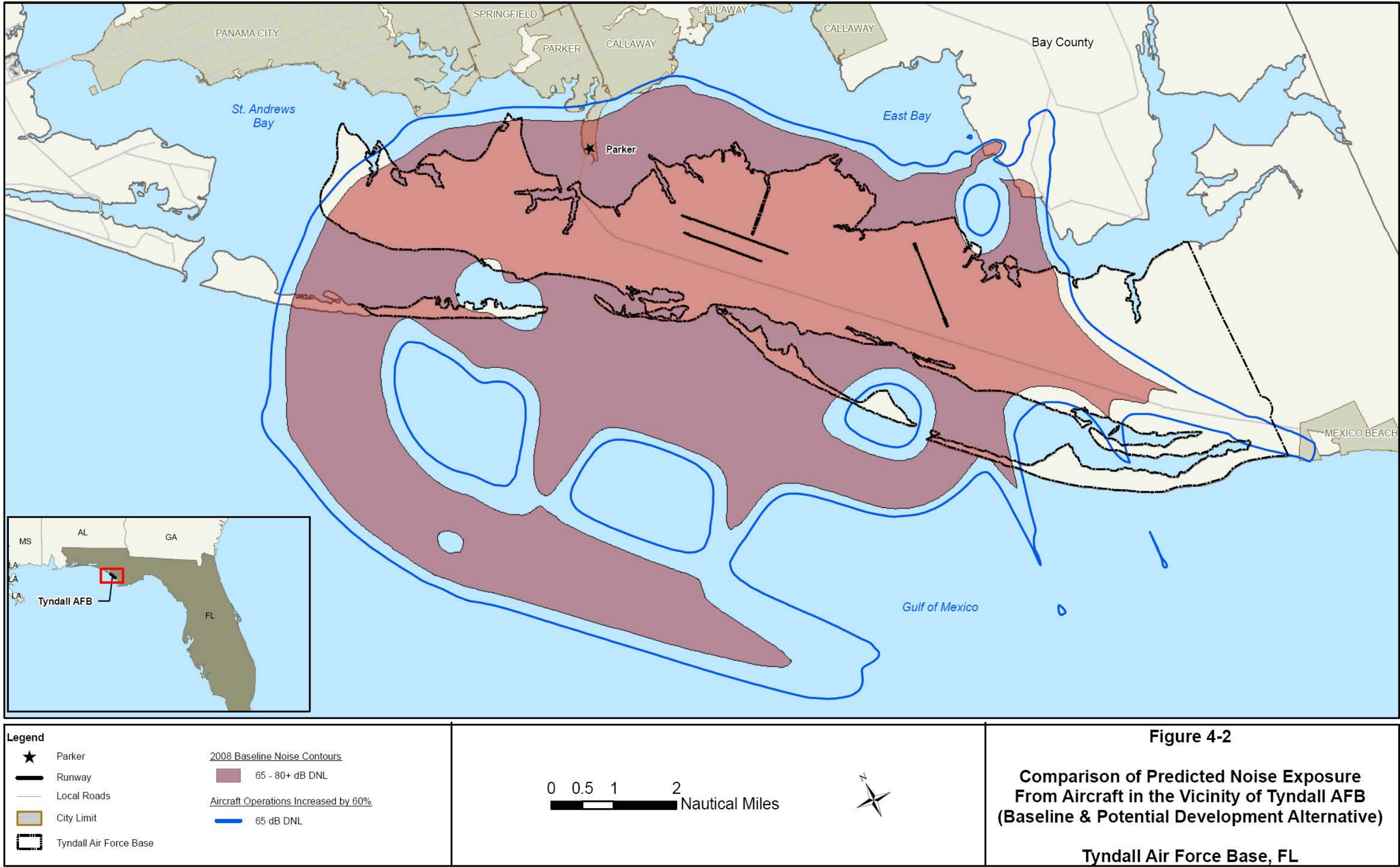
Noise Level DNL	Baseline: Land Area (In Acres)	Proposed Action: Land Area (In Acres)
65 to 69	29,676	36,006
70 to 74	14,221	18,988
75 to 80	6,641	9,607
>80	4,187	6,176
Total	54,725	70,777
Source: USAF 2007a DNL = Day-Night Average Sound Level		

Table 4-2 Comparison of Land Area Exposed to Elevated Noise Levels (Off Base and Excluding Water)

Noise Level DNL	Baseline: Land Area (In Acres)	Potential Development Alternative: Land Area (In Acres)
65 to 69	303	949
70 to 74	153	145
75 to 80	0	60
>80	0	0
Total	456	1,154
Source: USAF 2008a DNL = Day-Night Average Sound Level		

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For areas of predicted noise exposure with a value of less than the 65 dBA DNL level of exposure, a preferred method of analyzing potential impacts is to examine prevailing ambient noise levels at sensitive receptors and compare the predicted noise exposure from the PDA. It is useful to note that some increases of noise levels are not readily apparent to listeners. Table 4-3 presents noise levels and their corresponding perception.

Table 4-3 Decibel Changes and Perception

Changes in Noise Level (dB)	General Perception
3	Just Noticeable
5	More Noticeable
10	Twice As Loud
20	Much Louder

It is well accepted that sound level increases below 3 dBA are not perceptible. Additionally, it should be remembered that due to the logarithmic nature of the dB, a doubling of noise events creates a 3 dB increase. Table 4-4 presents a location identified by installation personnel as a noise-sensitive receptor, the baseline 2007 predicted noise exposure and the 2012 predicted noise exposure that would be expected if the PDA were implemented. Additional impacts associated with aircraft noise as they relate to land use are presented in the Section 4.3.3.

Table 4-4 Noise Exposure at Sensitive Receptors

Point Identification	Location/Sensitive Receptor	Baseline: Noise Level (DNL)	PDA: Noise Level (DNL)
1	Community of Parker, Florida (30° 6' 29.38" N; 85° 36' 13.96"W)	70.3 dB	72.3 dB
Source: USAF 2007a			

Construction Activities

The effect from operation of construction and demolition equipment would be similar to, but somewhat greater than those described for the Proposed Action. Selection and implementation of this alternative would indicate a greater level of ongoing construction activity for the time span of the PDA.

As noted in Section 4.4.1.1 (Proposed Action), noise associated with construction activities does not typically generate a predicted noise exposure of 65 dBA DNL or greater because even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year would produce a 65 dBA DNL. As with the Proposed Action, the contribution to the DNL by construction generated noise would still be expected to be under thresholds of annoyance (<64 dB DNL) and the location of construction equipment would be unknown. It is not possible to determine whether operation of said equipment would cause the existing DNL contours to shift. Therefore, a detailed analysis of construction noise is not performed in this assessment. However, it is foreseeable that increased noise from construction activities may temporarily occur as a result of the PDA. The causes and effects would be similar to but likely of longer duration than those described for the Proposed Action.

Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the renovation project; therefore, an extended disruption of normal activities is not anticipated. Overall, impacts associated with construction noise would not be significant.

4.3.2.4 Measures to Reduce Impacts

The Air Force engages in a program of extensive outreach to local communities to facilitate land use planning to foster the establishment of compatible uses in the vicinity of its installations. The AICUZ program at Tyndall AFB is an ongoing process. Additionally, the nature of training operations at Tyndall AFB tends to mitigate adverse noise effects and annoyance in that very few flight operations and ground engine runs occur between 2200 hours and 0700 hours.

Though the effects from construction noise are considered minimal, there are several BMPs that can be employed to further reduce the effect on residential areas. One BMP is to restrict the operation of extremely noisy equipment (e.g., brick cutters or jackhammers) before 0900 hours and after 1700 hours. Other BMPs to reduce construction-associated noise include utilizing properly operating and maintained equipment (e.g., possessing mufflers, gaskets, sharpened and lubricated blades), maximizing the distance of loud equipment from a residence, directing equipment to use less noise-sensitive routes, fitting silencers to combustion engines, fastening machinery covers or panels tightly, isolating vibrating parts/damping, constructing sound barriers to reduce propagation, or shutting off/idling machinery between work periods (Tempest 1985; Eaton 2000; Suter 2002).

4.3.3 Land Use

A comparative methodology was used to determine impacts to land use resources at Tyndall AFB. Facility operations and any construction or modification activities associated with each alternative were examined and compared to existing land use conditions and land use plans. Impacts were identified as they relate to changes in land ownership and use classifications, extent of changes, potential conflicting uses on base and off base, and accessibility concerns.

The Air Force AICUZ was described in Section 3.3.2. It is part of a broader effort undertaken by the military to identify and quantify shared natural assets, thereby allowing military installations to discourage encroachment by incompatible, off-installation uses. The Air Force implementation of this effort, the Natural Infrastructure Assessment process, is a multi-disciplinary planning study that examines resources such as airspace, water supply, air quality, frequency, and land use (USAF 2008b).

The proposed action or its alternatives could have a significant effect if they: 1) conflict in substantial fashion with existing land uses and master planning efforts undertaken by the installation or 2) conflict in substantial fashion with off-base land uses and master planning efforts of surrounding jurisdictions.

4.3.3.1 Proposed Action

4.3.3.1.1 Aircraft Operations

Under the Proposed Action, there would be no effect on land use either on or off the installation from flight operations. On-base land use planning efforts pertaining to aircraft noise, accident potential, and limiting obstructions to air navigation would continue under the existing regulations. The Air Force would continue to encourage surrounding jurisdictions to be cognizant of the land use implications arising from aircraft operations with respect to noise, accident potential and navigable airspace. Installation leadership and community planners would continue to collaborate with officials in surrounding jurisdictions to promote land use patterns consistent with ongoing operation of a significant military installation. Land use recommendations and implementation strategies contained in the 2007 AICUZ Report would continue in force.

4.3.3.1.2 Land Use Changes and Construction Projects

The projects identified in the Proposed Action generally conform with and are identified in the General Plan. The proposed construction would occur in areas designated for such activities in the Tyndall AFB General Plan. The Proposed Action would be compatible with existing land use in the vicinity of the projects. Approximately 936,000 SF of new construction would occur as a result of implementing the projects under the Proposed Action. The Air Force site selection and design planning process generally assures compliance with Air Force regulations pertaining to compatible land use, AICUZ, and prevention of obstructions to air navigation.

Under the Proposed Action, there would be no expected conflict with off-installation planning efforts undertaken by surrounding jurisdictions. Most of the boundary areas of the installation are open space and, for much of the installation, the land use interactions between Tyndall AFB and surrounding communities are buffered by St. Andrews Sound and East Bay. Effects arising from construction projects and resultant land use changes would be confined to the installation.

4.3.3.2 No-action Alternative

Land use would not be impacted if the No-action Alternative were selected. Existing land use patterns and development trends would continue on Tyndall AFB and off base, as described in Section 3.3.3.

4.3.3.3 Potential Development Alternative

In general terms, the PDA would alter existing land use classification by converting approximately 6,400 unconstrained developable open space to developed uses as outlined in the DOPAA and the 2008 Tyndall AFB Capability Analysis. The particular locations of these changes is not yet defined; instead, the conversion of land use would be from unconstrained developable open space to the remaining land use classifications in a manner that attributes the future land use in the same proportions as currently exist.

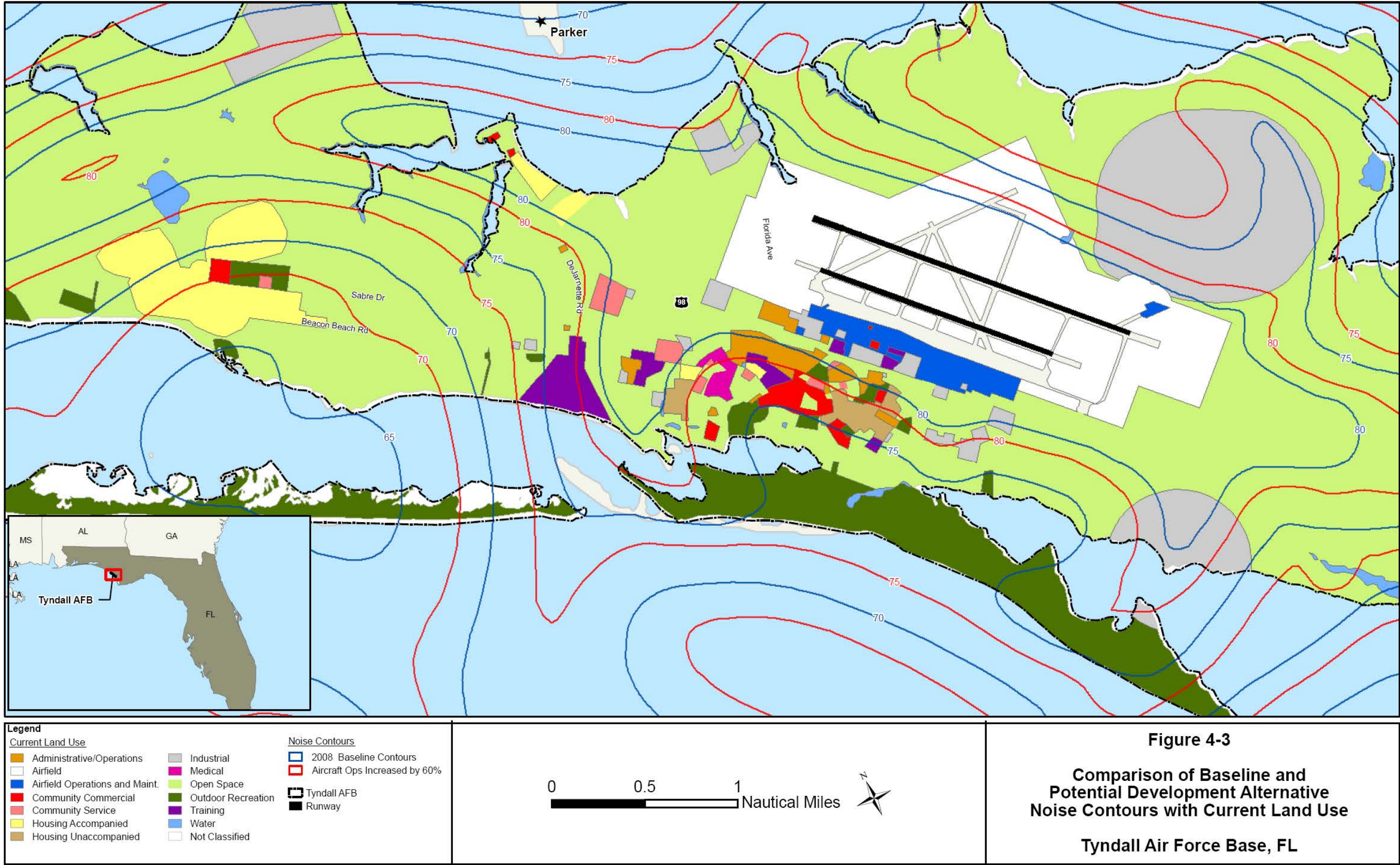
4.3.3.3.1 Aircraft Operations

Implementation of the PDA would result in an increase in predicted noise exposure stemming from increased aircraft operations. Figure 4-3 shows a comparison of the on-base land use with the baseline and PDA noise contours overlaid. The land area embraced within the noise contours would expand slightly. The off-installation change in predicted noise exposure is presented in Figure 4-2.

With implementation of the PDA it would be possible, but not likely, that the increased noise from aircraft operations would be perceptible to some on-base residents. The 65-80+ dBA DNL contours already embrace base housing areas that lie along the southwest side of the runway complex, across US Highway 98, and the housing areas northwest and west of the runway complex. The PDA would increase the predicted noise exposure occurring from Tyndall flight operations by 2 dBA DNL. The noise contours shift outward with respect to the runways. However, as noted in Table 4-3, a change of less than 3 dBA DNL is not ordinarily perceptible.

Areas around Tyndall AFB would remain subject to noise levels of 65 dB DNL or greater, but land uses generally remain compatible within these levels. A review of the 2008 AICUZ report, and the noise analysis presented in Section 4.3.2 indicates that most of the real estate exposed to a slight increase in DNL from the PDA is either part of Tyndall AFB open space lands or water. It was estimated that fewer than 400 residents live within a noise contour (USAF 2008a). Portions of the areas experiencing an increase in noise exposure may include open space, residential and commercial land. The area surrounding Tyndall AFB is already subjected to flight activity, including regular low-level overflights of military aircraft arriving and departing from the airfield. Specifically, additional areas of Bay County in the vicinity of the community of Parker north of Tyndall AFB would be continue to be enclosed within the 70 and 75 dbA DNL contours, experiencing an increase in predicted noise exposure of 2 dBA DNL. The recommended land uses and strategies for achieving compatibility with aircraft noise would remain the same.

Whether on- or off-base, the adverse effects that normally would be anticipated from the PDA would be reduced by the ordinary noise attenuation that occurs with modern construction techniques and with specialized interior NLR that would occur by minimizing openings from doorways, windows, chimneys and plumbing vent stacks. The indoor NLR expected from these improvements is approximately 20 dBA.



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4.3.3.3.1 Land Use Changes and Construction Projects

Land use resources would not be negatively impacted under this alternative. The proposed land use changes from unconstrained, developable open space to the other land uses identified on the installation would by definition only occur in areas that would not create land use conflicts due to munitions safety considerations, aircraft operations and environmental concerns. Approximately 1.2 million SF of new construction and renovation would occur as a result implementing the projects in the PDA.

The land use changes and particular facilities projects identified in the PDA, while not identified in the General Plan, would nonetheless still be undertaken in compliance with AFI 32-7062 Air Force Comprehensive Planning. In fact, identification of potential development opportunities and development of plans that would capitalize upon those opportunities is one of the objectives outlined in the AFI for an installation comprehensive plan. Adherence to the site selection and facility design process outlined in the AFI would generally assure that land use changes and projects contained within the PDA are compatible with existing land use in the vicinity of the projects, would not be incompatible with respect to AICUZ land use recommendations, and would not result in the construction of an obstruction to air navigation. By virtue of the acres being unconstrained, incompatibilities arising from the land's having environmental, cultural resource, or other issues would, by definition, not occur. Further, Air Force regulations governing programming of funding, development of detailed site plans and construction drawings, and the letting of construction contracts would require individual records of environmental consideration, including compliance with NEPA and other pertinent environmental and occupational health and safety regulations.

There would be no conflict with off-installation planning efforts undertaken by surrounding jurisdictions as land use changes would be confined to the installation. Most of the boundary areas off the installation are open space and for much of the installation, the land use interactions between Tyndall AFB and surrounding communities are buffered by St. Andrews Sound and East Bay.

4.3.3.4 Measures to Reduce Impacts

The Air Force engages in a program of extensive outreach to local communities to facilitate land use planning to foster the establishment of compatible uses in the vicinity of its installations. The AICUZ program at Tyndall is an ongoing process. In the event that aircraft operations were to increase, an updated AICUZ study would be prepared and updated noise contours and compatible land use planning recommendations would be furnished to the adjacent municipalities. Additionally, the nature of flight operations at Tyndall AFB tends to reduce adverse noise effects and annoyance in that very few flight operations and ground engine runs occur between 2200 and 0700 hours.

4.3.4 Air Quality

The following factors were considered in evaluating air quality: (1) the short- and long-term air emissions generated from construction and demolition activities; (2) the type of emissions generated; and (3) the potential for emissions to result in ambient air concentrations that exceed

one of the NAAQS or SIP requirements. As indicated in Section 3.3.4.3, Bay County is currently USEPA designated as an attainment area for all criteria pollutants. Therefore, Tyndall AFB is not currently subject to the General Conformity regulations. However, the State of Florida has recommended that Bay County be designated as non-attainment for ozone by the USEPA and a formal designation is anticipated by March 2010. Therefore, all construction, demolition, renovation, and operational activities occurring after designation of non-attainment for ozone would need to be evaluated for general conformity compliance. For the purposes of this analysis, impacts to air quality could be considered significant if emissions from the proposed or alternative actions would be considered regionally significant by the USEPA.

Potential emissions from the proposed and alternative actions would occur primarily from demolition and construction activities at Tyndall AFB and would include activities such as grading, filling, paving, and equipment operation. Thus, emissions would be localized within the area surrounding the project location. For this reason, the analysis in this EA will address potential impacts within the Panama City-Lynn Haven MSA, instead of the entire AQCR that covers a large geographical area.

4.3.4.1 Proposed Action

The Proposed Action would result in short-term emissions during construction, demolition, and associated infrastructure improvements, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. There would be no or a negligible increase in long-term emissions as it is assumed that personal operated vehicle (POV) and government vehicle use would remain relatively the same and the Proposed Action would not involve any changes in facility mission or operations. Stationary source emissions are assumed to remain the same. New equipment installed at the installation would be more efficient and have lower emissions than the equipment currently present. It is also possible that the installation or modification of any air emission sources, such as boilers and heaters, emergency generators, paint booths, degreasers, etc., might trigger permitting requirements with the FDEP's Division of Air Resources Management.

The combustion of fuel by the construction equipment and related vehicles involved in the Proposed Action would cause an increase in CO, VOC, NO_x, SO₂, and PM₁₀ and PM_{2.5}. Fugitive dust would be created by the construction equipment as it disturbs soils.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked on and the level of construction activity. Western Regional Air Partnership (WRAP) developed a fugitive dust handbook that addresses the estimation of uncontrolled fugitive dust emissions and emission reductions achieved by demonstrated control techniques for eight major fugitive dust source categories. The handbook focuses on fugitive dust emissions "at the source" and does not evaluate factors related to the transport and impact of emissions on downwind locations. The methods for estimating emissions draw from: (a) established methods published by the USEPA, specifically AP-42: Compilation of Air Pollutant Emission Factors; and (b) from alternate methods adopted by state and local air control agencies in the WRAP region such as the California Air Resources Board, Clark County, Nevada, and Maricopa County, Arizona. Sources of data are identified and default values for emission factor correction parameters, source extent/activity levels, control efficiencies, and emission reductions

by natural mitigation and add-on control measures are provided. The fugitive dust emissions from construction and demolition used the average emission factors provided in Section 3.2 of the WRAP Fugitive Dust Handbook (WRAP 2004). Because PM_{2.5} emissions factors have not been developed for all operations, it is conservatively assumed that PM_{2.5} emissions are equivalent to PM₁₀ emissions. The emissions presented in Table 4-5 include the estimated annual PM₁₀ and PM_{2.5} emissions associated with the uncontrolled fugitive dust emissions from the proposed construction and demolition sites. These emissions would produce slightly elevated short-term PM₁₀ ambient air concentrations. The USEPA estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. Watering the disturbed area of the construction site twice per day with approximately 3,500 gallons per acre per day would reduce total suspended particulate emissions as much as 50 percent (USEPA 1995). The effects from fugitive dust would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Specific information describing the types of construction equipment required for a task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established cost estimating methodologies for construction and experience with similar types of construction projects (Means 1996). Combustive emissions from construction equipment exhaust were estimated by using USEPA-approved emissions factors for heavy-duty, diesel-powered construction equipment (USEPA 2000) along with the emission factors for the estimated types and numbers of equipment expected to be used during construction. These emissions are included in Table 4-5. As with fugitive dust emissions, the construction and demolition equipment emissions would produce slightly elevated air pollutant concentrations. However, the effects from construction and demolition activities would last only as long as the duration of the activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Emissions for the Proposed Action are summarized in Table 4-5 and would occur as a result of construction and demolition activities. The Proposed Action would not involve any changes in facility mission or operations, and there would be no increase in the number of personnel employed at the facilities. Therefore, long-term emissions are not expected to increase. In fact, it is likely that long-term air emissions will be reduced as operations move into the new facilities because updated controls will be included in the new buildings.

Review of emissions from the Proposed Action in Table 4-5 indicates that the greatest percentage of impact to the local emissions in a given year during the project would be PM₁₀/PM_{2.5} (76.2 tpy increase) at 1.3 percent from the combined construction and demolition operations during year 2010 of the project. The emissions would be temporary and would be eliminated after the activity is completed. All emissions would fall below the 10 percent level that would be considered regionally significant by the USEPA.

The emission of minor amounts of air pollution would be unavoidable; however, the individual and cumulative impacts during construction and demolition would be minor when compared to the 2002 Panama City-Lynn Haven MSA emissions.

Table 4-5 Expected Emissions per Proposed Action Construction/Demolition Year

	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^a
2009 Proposed Action (tpy)	2.6	18.1	4.3	0.46	12.9	12.9
2010 Proposed Action (tpy)	21.6	111	39.4	4.2	76.2	76.2
2011 Proposed Action (tpy)	1.4	7.0	2.8	0.29	7.4	7.4
2012 Proposed Action (tpy)	40.4	25.8	90.5	9.6	47.3	47.3
2002 Panama City-Lynn Haven MSA (tpy) ^b	66,328	14,853	13,232	17,067	6,064	6,064
Greatest Percent of Regional Emissions	0.061	0.75	0.68	0.056	1.3	1.3
Notes: CO = carbon monoxide MSA = Metropolitan Statistical Area NO _x = nitrogen oxides PM _{2.5} = particulate matter equal or less than 2.5 micrometers in diameter PM ₁₀ = particulate matter equal or less than 10 micrometers in diameter SO _x = sulfur oxides tpy = tons per year VOC = volatile organic compound ^a PM _{2.5} emissions assumed = PM ₁₀ emissions. ^b Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Panama City-Lynn Haven MSA consists of Bay County. Source: USEPA 2002, AIRData; Emissions come from an extract of USEPA's National Emission Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html						

4.3.4.2 No-action Alternative

Under the No-action Alternative, there would be no change in the Tyndall AFB emissions described in Section 3.3.4.

4.3.4.3 Potential Development Alternative

As in the Proposed Action, the PDA would result in short-term emissions during construction, demolition, and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. The additional 5,184 personnel would increase long-term emissions from government and POV use. The implementation of more stringent air pollution controls on motor vehicles would reduce the emissions from government and POVs. Stationary source emissions are assumed to remain relatively the same. New equipment installed at the base would be more efficient and have lower emissions than the equipment currently present. It is also possible that the installation or modification of any air emission sources, such as boilers and heaters, emergency generators, paint booths, degreasers, etc., might trigger permitting requirements with the FDEP's Division of Air Resources Management.

Short-term emissions for the PDA are summarized in Table 4-6 and would occur as a result of construction and demolition activities. Review of emissions from the PDA in Table 4-6 indicates that the greatest percentage of impact to the local emissions in a given year during the project would be PM₁₀/PM_{2.5} (316 tpy increase) at 5.2 percent from the combined construction and demolition operations during year 2010 of the project. The emissions would be temporary

and would be eliminated after the activity is completed. All emissions would fall below the 10 percent level that would be considered regionally significant by the USEPA.

The emission of minor amounts of air pollution would be unavoidable; however, the individual and cumulative impacts during construction and demolition would be minor when compared to the 2002 Panama City-Lynn Haven MSA emissions.

Table 4-6 Expected Emissions per PDA Construction/Demolition Year

	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^a
2009 PDA Action (tpy)	34.2	454	36.3	3.8	253	253
2010 PDA Action (tpy)	53.2	547	71.4	7.6	316	316
2011 PDA Action (tpy)	33.1	443	34.8	3.7	247	247
2012 PDA Action (tpy)	72.0	461	122	13.0	287	287
2013 PDA Action (tpy)	33.7	436	37.0	3.9	247	247
2002 Panama City-Lynn Haven MSA (tpy) ^b	66,328	14,853	13,232	17,067	6,064	6,064
Greatest Percent of Regional Emissions	0.11	3.7	0.92	0.076	5.2	5.2
Notes: CO = carbon monoxide MSA = Metropolitan Statistical Area NO _x = nitrogen oxides PM _{2.5} = particulate matter equal or less than 2.5 micrometers in diameter PM ₁₀ = particulate matter equal or less than 10 micrometers in diameter SO _x = sulfur oxides tpy = tons per year VOC = volatile organic compound ^a PM _{2.5} emissions assumed = PM ₁₀ emissions. ^b Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Panama City-Lynn Haven MSA consists of Bay County. Source: USEPA 2002, AIRData; Emissions come from an extract of USEPA's National Emission Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html						

Upon completion of the PDA, aircraft operations are anticipated to increase 60 percent from that of the 2008 baseline and Proposed Action. Therefore, annual long-term emissions from aircraft operations would increase. The Emissions and Dispersion Modeling System (EDMS, Version 5.1) was chosen to assess the potential annual increase in air emissions from aircraft and associated ground support equipment. The model was developed by the FAA in cooperation with the United States Air Force. EDMS is the FAA required and the USEPA preferred model for the assessment of aviation-related sources of criteria air pollutants. To estimate the annual emissions for the 2008 baseline and the PDA, the aircraft type and annual operations from Table 2-3 were used with EDMS (EDMS 2008) default parameters for Tyndall AFB. The EDMS model inputs are included in Appendix C.

The long-term annual emission increase for the PDA are summarized in Table 4-7 and would occur as a result of the 60 percent increase in aircraft operations and an additional 5,184 personnel on base. All emissions would fall below the 10 percent level that would be considered regionally significant by the USEPA.

Table 4-7 Long-term Annual Emissions from Increased Aircraft Operations

	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^a
PDA Aircraft Operations (tpy)	2,228	632	769	97.4	5.6	5.6
2008 Baseline Aircraft Operations (tpy)	1,393	395	481	60.9	3.5	3.5
Increase in Annual Emissions from Government and POV (tpy)	73.9	76.2	7.6	0.10	0.79	0.79
Total Increase in Annual Emissions (tpy)	910	313	296	36.6	2.9	2.9
2002 Panama City-Lynn Haven MSA (tpy) ^b	66,328	14,853	13,232	17,067	6,064	6,064
Percent of Regional Emissions	1.4	2.1	2.2	0.21	0.048	0.048
Notes: CO = carbon monoxide MSA = Metropolitan Statistical Area NO_x = nitrogen oxides PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter PM₁₀ = particulate matter equal or less than 10 micrometers in diameter POV = privately owned vehicle SO_x = sulfur oxides tpy = tons per year VOC = volatile organic compound ^a PM_{2.5} emissions assumed = PM₁₀ emissions. ^b Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Panama City-Lynn Haven MSA consists of Bay County. Source: USEPA 2002, AIRData; Emissions come from an extract of USEPA's National Emission Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html						

4.3.4.4 Measures to Reduce Impacts

Little impact to local air quality would be expected from the proposed and alternative actions associated with facility construction, demolition and associated activities at Tyndall AFB. Therefore, no mitigative actions would be required. BMPs would include watering the disturbed area of the construction, covering dirt and aggregate trucks and/or piles, prevention of dirt carryover to paved roads, and the use of erosion barriers and wind breaks.

4.3.5 Earth Resources

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of the Proposed Action and alternatives on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development.

Analysis of potential impacts on geological resources typically includes:

- Identification and description of resources that could potentially be affected,
- Examination of the Proposed Action and alternatives and the potential effects they may have on the resource, and
- Provision of mitigation measures in the event that potentially adverse impacts are identified.

Effects on geology and soils could be significant if they substantially alter the lithology, stratigraphy, and geological structures or change the soil composition, structure, or function within the environment

4.3.5.1 Proposed Action

Under the Proposed Action, construction and demolition activities, such as removal, grading, excavating, and recontouring of the soil, would result in soil disturbance. The soils in the vicinity of the proposed construction projects at Tyndall AFB have been altered over time, and the project areas have been permanently disturbed by existing facilities and paved roads. Impacts would include an increase in soil erosion that would be minimized through the implementation of BMPs to reduce soil loss. As a result of prior disturbance and development in the project areas, the Proposed Action would not be expected to alter the lithology, stratigraphy, or geological structures; or change the soil composition, structure, or function. However, localized changes to surficial soil composition would occur at each site of construction.

4.3.5.2 No-action Alternative

Under the No-action Alternative, earth resources would not change from the baseline conditions described in Section 3.3.4.

4.3.5.3 Potential Development Alternative

Under the PDA, potential impacts would be similar to those described under the Proposed Action; however, construction would occur on approximately 6,442 acres of land, or 75 percent of the developable land on base. Under this alternative, projects apart from Proposed Action projects may have the potential to be located in areas of the installation that have not been previously developed. Although this would result in a decreased amount of open space on base, major impacts to geologic resources are not expected. When specific project locations are identified, additional analysis with respect to geologic resources may have to be performed. While the project areas would experience soil loss due to construction, this soil loss would be reduced through the use of BMPs.

4.3.5.4 Measures to Reduce Impacts

Should the Proposed Action or the PDA be implemented, mitigation measures would not be needed. However, proposed construction projects should include site-specific sediment and erosion control plans that detail BMPs to prevent soil loss, capture and contain loose soil, and slow the movement of stormwater during heavy rains. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, thereby reducing the total amount of soil lost to wind.

4.3.6 Biological Resources

Impacts to biological resources could be considered significant if species or habitats of concern are adversely affected over relatively large areas of their range or if disturbances reduce population size or distribution.

4.3.6.1 Proposed Action

Implementation of the Proposed Action would have minimal effects on the biological resources at Tyndall AFB. The Proposed Action would result in developing approximately 8.9 acres of facility space on lands defined by the Tyndall AFB INRMP (USAF 2006a) as developed military areas. Developed military areas are defined as areas that had previously been disturbed and are characterized by landscaped areas in and among buildings, roads and parking areas. Only the construction of the Consolidated Airbase Technologies Division Campus will fall in a vegetative community (i.e., Slash, Longleaf, and Sand Pine Plantations). However, wildlife such as small mammals and birds inhabiting this site and those occurring in the developed military would be expected to relocate to other vegetated areas on or surrounding the base where there is suitable habitat. As described in Section 3.3.5, the majority of the listed animal and plant species found on Tyndall AFB are located in undeveloped portions on the installation and not in the area of any proposed construction or demolition activities.

Noise from construction activities, increased traffic, and earth moving activities could potentially temporarily disturb wildlife near the construction areas. This disturbance is expected to be short-term and minor given the existing noise environment adjacent to an active airfield.

The Proposed Action adheres to the management recommendations outlined in the INRMP and will avoid development in environmentally sensitive areas such as barrier islands, wetlands, and areas of suitable habitat of known locations of threatened and endangered species. Therefore, no direct or indirect impacts to barrier islands, wetlands, or threatened and endangered species would be expected to occur as a result of the Proposed Action. Exterior lighting on new construction could have an adverse impact on nesting and hatchling sea turtles or the Choctawhatchee and St. Andrew beach mice if any of the lighting illuminates, contributes to cumulative sky glow, or is visible from the beach and dune habitats on Shell Island, or East and West Crooked Islands. However, BMPs such as ensuring that lighting for new facilities is fully shielded or equipped with a full-cut off fixture will reduce impacts to nesting or hatchling sea turtles and beach mice.

4.3.6.2 No-action Alternative

Implementation of the No-action Alternative would not change the baseline environment for Biological Resources discussed in Section 3.3.5.

4.3.6.3 Potential Development Alternative

This alternative proposes to develop approximately 6,442 acres of current open space that is not considered as environmentally sensitive areas, such as barrier islands, wetlands and areas of suitable habitat, or known locations of threatened and endangered species. Development activities would adhere to management recommendations outlined in the INRMP. It should be noted that the intensity of the proposed development varies. Although, this intensity is significantly different from the development planned in the Proposed Action (i.e., the increased amount of acreage) it is expected that the removal of these areas as available habitat would not adversely affect wildlife and rare plant populations common in these communities. Animal species inhabiting these areas would be able to relocate to suitable habitat adjacent to these

activities, and Florida Natural Areas Inventory surveys of rare plants of Tyndall AFB indicate that there would be no indirect or direct impact of these actions since these plant species are not located in the vicinity of these proposed construction activities.

4.3.6.4 Measures to Reduce Impacts

As outlined in the Tyndall AFB INRMP, the installation is aggressively taking steps to restore and enhance vegetative communities to their historical state. If the PDA were implemented, these restoration activities would be allowed to continue to grow in order to assure that a suitable and diverse habitat would be created and maintained for displaced wildlife. Additionally, for either the Proposed Action or PDA, BMPs would be used at construction sites to reduce sediment runoff affecting habitat living in receiving waters.

Under the PDA, it is recommended that habitat assessment and species surveys be conducted to document potential project effects on these species. Where appropriate, habitat assessments for the threatened Violetflowered Butterwort (*Pinguicula ionantha*), and the following species at risk: Largedleafed Jointweed (*Polygonella macrophyllia*), Gulf Coast Lupine (*Lupinus westianus*), Quillwort Yellow-eyed Grass (*Xyris isoetifolia*), Karst Pond Yellow-eyed Grass (*Xyris longisepala*), Giant Water Dropwort (*Oxypolis greenmanii*), and Thick-leaved Water Willow (*Justica crassifolia*) should be conducted to avoid potential project effects on these plants.

Additional surveys for several species of migratory birds, the Gopher Tortoise and Eastern indigo snake (*Drymarchon couperi*) should be conducted prior to implementation of the PDA. Least terns, black skimmers, occasional gull-billed tern (all protected by the Migratory Bird Treaty Act), are known to nest on gravel rooftops. Gravel rooftop buildings slated for demolition need a survey conducted for nesting birds if destruction occurs between 1 April and 1 September on any given year. If nesting birds are located on the rooftops, demolition will need to be postponed until the birds have completed nesting for that season.

Gopher Tortoises are state protected species and are considered a federal species at risk. Surveys for burrows are recommended prior to implementation of the Proposed Action or PDA. If any gopher tortoise burrows are located on any of the proposed project sites, the Florida Fish and Wildlife Conservation Commission should be contacted and the investigation should be expanded to determine the presence or absence of the Eastern indigo snake since they have an affinity for gopher tortoise burrows. Although not documented on Tyndall AFB, Tyndall AFB has considerable areas of high quality habitat representative of Florida, and may support populations of the Eastern indigo snake. Conversely, efforts should be made to ensure construction personnel, contractors, and subcontractors be cautioned to refrain from killing or harassing snakes and to immediately report any sighting of indigo snakes.

Additionally, if either the Proposed Action or PDA is selected, it assumed that BMPs would be used at construction and project sites to minimize potential effects on biological resources. This should include general provisions such as reducing sediment runoff affecting habitat living in receiving waters, and more specific needs like making sure that lighting for new facilities is fully shielded or equipped with a full-cut off fixture. No other mitigative actions would be required.

4.3.7 Cultural Resources

Significant impacts to cultural properties could occur only if the proposed or alternative actions would adversely affect historic properties. An adverse effect is an undertaking that diminishes the integrity of a property's location, design, setting, materials, workmanship, feeling, or association. An adverse effect can occur through the destruction or alteration of the property, isolation from or alteration of the environment, introduction of intrusive elements (visual, audible, or atmospheric), neglect, and the transfer, lease or sale of the property (ACHP and GSA Interagency Training Center 1995). Any adverse effect to a historic property would require consultation with the State Historic Preservation Officer and appropriate Tribal Historic Preservation Officers to determine a means of mitigating the adverse effect through avoidance, data recovery, or documentation.

The nature and potential significance of cultural resources (i.e., archaeological sites, buildings, structures, objects, or traditional cultural properties) in the potentially affected areas were identified by considering the following definition: Historic properties, under 36 CFR Part 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP." For the purpose of these regulations this term includes artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP-listing criteria.

Impacts to cultural resources would be significant if the proposed activities destroyed or impacted a NRHP-eligible site, building, or structure prior to mitigation.

4.3.7.1 Archaeological Resources

4.3.7.1.1 Proposed Action

The Proposed Action would involve demolition of 64 buildings (37 WWII, 25 Cold War-era, and 2 post-Cold War-era) and the construction of new buildings and structures at various locations within Tyndall AFB. The proposed demolition of existing buildings and construction within the existing cantonment area would have a low probability of effect on undisturbed archaeological resources. Any resources that may be present have probably been disturbed or destroyed and have little or no potential eligibility. Proposed construction in undeveloped areas adjacent to the cantonment or elsewhere, however, could potentially impact archaeological sites and represent an adverse effect to historic properties. This is particularly true for the area east of the cantonment area where known archaeological properties are within or adjacent to areas proposed for future land use (e.g., Consolidated Airbase Technologies Division, Algae Bio-Fuel Plant, Family Camp, and proposed construction in support of Live Ordnance Loading Area). If cultural resources are encountered, survey and evaluations of NRHP-eligibility by a qualified cultural resource professional and SHPO concurrence with eligibility determinations must be conducted in these areas prior to disturbance. If archaeological sites are determined eligible for inclusion in the NRHP, a mitigation plan must be developed in consultation with the SHPO and interested parties and implemented prior to construction.

4.3.7.1.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions as described in Section 3.3.7.1.

4.3.7.1.3 Potential Development Alternative

The PDA differs from the Proposed Action in that a broader approach to installation and mission development at Tyndall AFB would be undertaken. The PDA would involve renovation of one building (Building 950) and demolition of 76 buildings (39 WWII, 34 Cold War-era, and 3 post-Cold War-era) and the construction of new buildings and structures at a larger number of locations within Tyndall AFB. The proposed demolition of existing buildings and construction within the existing cantonment area would have a low probability of effect on undisturbed archaeological resources. Any resources that may be present have probably been disturbed or destroyed and have little or no potential eligibility. Proposed construction in undeveloped areas adjacent to the cantonment or elsewhere, however, could potentially impact archaeological sites and represent an adverse effect to historic properties. This is particularly true for the area east of the cantonment area where known archaeological properties are within or adjacent to areas proposed for future land use.). If cultural resources are encountered, survey and evaluations of NRHP-eligibility by a qualified cultural resource professional and SHPO concurrence with eligibility determinations must be conducted in these areas prior to disturbance. If archaeological sites are determined eligible for inclusion in the NRHP, a mitigation plan must be developed in consultation with the SHPO and interested parties and implemented prior to construction.

4.3.7.2 Historic Resources

4.3.7.2.1 Proposed Action

The Proposed Action would involve demolition of 64 buildings (37 WWII, 25 Cold War-era, and 2 post-Cold War-era). The Proposed Action would also include new construction.

The Proposed Action would have no effect on the 37 WWII historic properties, which are covered under the 1986 Programmatic Agreement for WWII temporary buildings. The Proposed Action would also have no effect on Buildings 1127 and 1016, which are not of historic age and are not associated with significant events at the national level. New construction would have no effect on historic properties, for no NRHP-eligible districts are present.

The eligibility status of the remaining 25 Cold War-era historic resources is currently unknown as no evaluation has occurred. It is recommended that 15 of these resources (Buildings 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1615, 421, 214, 1616, 1617, 1680, and 6030) are ineligible for listing on the NRHP as they are housing and support facilities that do not meet the requirements for exceptional importance under Criterion Consideration G. The remaining Cold War-era resources (Buildings 968, 1265, 419, 422, 425, 1352, 457, 458, 451, and 474) should be evaluated for NRHP eligibility by a qualified cultural resource professional. SHPO concurrence with the eligibility recommendations would be required prior to the demolition of any Cold War-era buildings involved in the Proposed Action.

4.3.7.2.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions as described in Section 3.3.7.2.

4.3.7.2.3 Potential Development Alternative

The PDA differs from the Proposed Action in that a broader approach to installation and mission development at Tyndall AFB is proposed. The PDA would involve demolition of the same 64 buildings (37 WWII, 25 Cold War-era, and 2 post-Cold War-era) as in the Proposed Action, but in addition would include the renovation of the Base Exchange and demolition of 12 more buildings for a total of 77 buildings that would be impacted. Of the 13 additional buildings to be renovated or demolished under the PDA, two are WWII historic properties (Buildings 149 and 531), one (Building 266) is not of historic age, and the remaining ten (Buildings 546, 560, 561, 562, 1275, 1277, 1279, 1282, 1283, and the Base Exchange) are Cold War-era resources. The PDA would also include new construction.

The PDA would have no effect on the 39 WWII historic properties which are covered under the 1986 Programmatic Agreement for WWII temporary buildings.

The PDA would also have no effect on Buildings 1127, 1016, and 266 which are not of historic age and are not associated with significant events at the national level. New construction would have no effect on historic properties, for no NRHP-eligible districts are present.

The eligibility status of the remaining 35 Cold War-era historic resources is currently unknown as no evaluation has occurred. It is recommended that 19 of these resources (Buildings 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1615, 421, 214, 1616, 1617, 1680, 6030, 560, 561, 562, and 950) are ineligible for listing on the NRHP as they are housing and support facilities that do not meet the requirements for exceptional importance under Criterion Consideration G. The remaining Cold War-era resources (Buildings 968, 1265, 419, 422, 425, 1352, 457, 458, 451, 474, 546, 1275, 1277, 1279, 1282, and 1283) should be evaluated for NRHP eligibility by a qualified cultural resource professional. SHPO concurrence with the eligibility recommendations would be required prior to the demolition of any Cold War-era buildings involved in the PDA.

4.3.7.3 Measures to Reduce Impacts

For construction in previously disturbed areas, Tyndall AFB should create contingency plans in the event of fortuitous finds or unexpected discoveries during construction activities. If any cultural resources are observed during construction, ground disturbing activities should cease and survey and evaluations of NRHP-eligibility by a qualified cultural resource professional and SHPO concurrence with eligibility determinations must be conducted. Additionally, if ground disturbing activities occur in previously undisturbed areas, the areas should be subjected to a cultural resources survey. If archaeological sites are determined eligible for inclusion in the NRHP, a mitigation plan must be developed in consultation with the SHPO and interested parties and implemented prior to construction. SHPO concurrence with the eligibility recommendations would also be required prior to the demolition of any Cold War-era buildings involved in the Proposed Action or PDA.

4.3.8 Water Resources

Impacts to surface water and groundwater resulting from the proposed or alternative actions could be significant if project activities resulted in substantial, long-term degradation of surface or groundwater water quality. Impacts could also be significant if construction in flood plains or increases in impervious cover caused major disturbances in the natural flow, discharge, and recharge of water resources. Water quantity concerns, as applied to municipal water supplies, are discussed in the Utilities and Infrastructure section.

4.3.8.1 Surface Water

4.3.8.1.1 Proposed Action

The actions associated with the Proposed Action that have the potential to impact surface water resources are: demolition activities, shallow excavation, paving, and construction activities. The potential for increased sediment loading of surface water during the initial demolition and construction activities would be the most likely impact associated with the Proposed Action. This potential impact would be short-term and manageable through implementation of a SWPPP along with the incorporation of BMPs for sediment control during construction. Implementation of these actions would minimize potential impacts to water quality.

Six of the individual projects under the Proposed Action, would be expected to disturb over one acre of soil. These include construction of a dormitory complex, consolidated airbase technologies campus, six bay hangar, base civil engineering complex, family camp, and visitors quarters and conference center. Each of these projects would require submission of a Notice of Intent under the General Permit for Stormwater Discharge from Large and Small Construction Activities to the FDEP, and creation and implementation of a SWPPP (FDEP 2003).

Based upon Table 2-2, the Proposed Action would result in a total increase of 390,898 square feet of impervious cover associated with the proposed construction and demolition projects. This represents an approximate one percent increase in impervious cover (908 acres of existing impervious cover) on the installation. This increase of impervious cover would result in an increase of surface water runoff entering the stormwater system by 17.62 cubic feet per second (cfs) creating a total of 1908.17 cfs. The increased runoff has the potential to increase sediment loads within the water bodies. The increase in sediment loads should be maintained and managed by the proper implementation of the base-wide BMPs and engineering controls as stated in the base-wide SWPPP. No major disturbances in the natural flow, discharge, and recharge of surface water resources would be expected as a result of the Proposed Action.

In accordance with the Energy Independence and Security Act of 2007, all proposed construction projects should include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of runoff flow.

4.3.8.1.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.8.1.

4.3.8.1.3 Potential Development Alternative

Impacts resulting from the PDA would be similar to those described for the Proposed Action except the increase in construction and facility space would result in an increase of 983 acres of impervious cover. The increase in impervious cover would represent a 108 percent increase in the current installation's impervious cover. Implementation of this alternative would increase runoff, allowing for an increase sediment load, and would have the potential to negatively change the quality of the surface water. The increase in impervious cover has the potential to create an increase to 3,745.5 cfs of overland flow during a two year rain event. This increase in stormwater runoff would be relatively evenly dispersed throughout the seven outfalls, as to ensure that the receiving bodies of water can handle the increase. The final receiving bodies of water, East Bay and St. Andrews Sound, are large bodies of water which can accommodate a large amount of discharged water. A short-term increase in sediment load could result during construction activities. The increase in surface runoff should be maintained and managed by the proper implementation of the base-wide SWPPP. Also, to manage the increase in stormwater quantity, the stormwater drainage system would need to ensure that it has the capacity to capture and disperse the increased amount as this development occurred. The increase in short-term sediment load should be managed by proper implementation of a site specific SWPPP. No major disturbances in the natural flow, discharge, and recharge of surface water resources would be expected as a result of the PDA.

4.3.8.1.4 Measures to Reduce Impacts

In order to minimize the potential for increased total suspended solids in downstream surface water bodies, the base-wide SWPPP, and where necessary, construction-site specific SWPPPs should be implemented. Additionally, an Environmental Resource Permit for stormwater management and wetland resource protection would be required from the FDEP, Northwest District Office. To minimize the impacts to surrounding communities who utilize surface water, water saving devices should be installed within the new facilities to decrease the amount of water used. Reclaimed water and/or rainwater should be used for irrigation purposes as well as for bathroom facilities. Proposed development activities should be conducted in a manner that does not structurally impair, reduce the flow of, or increase sediment loading of any on-site or adjacent waterbodies. Construction buffers should be maintained at all times and may include staked hay bales, staked filter cloth, and planting of native species. Use of fertilizers, pesticides, and herbicides should be avoided. Native species should be preserved on-site during construction to minimize the need to replant once construction is completed. To decrease runoff, pervious surfaces, such as concrete grass pavers should be utilized where appropriate as opposed to impervious surfaces. No other mitigative actions would be required.

4.3.8.2 Ground Water

4.3.8.2.1 Proposed Action

Implementation of the Proposed Action is not expected to impact the quality of groundwater at Tyndall AFB or the surrounding area. Groundwater beneath Tyndall AFB is located within a shallow aquifer that is recharged by local precipitation. Impervious cover at the installation under this alternative would increase by 55 acres but this would represent a negligible change with respect to the overall recharge area of the underlying aquifer. Also, there is a potential for

excavation activities as part of construction or demolition activities to reach groundwater. If groundwater were encountered, care would be taken during construction activities to ensure that groundwater resources would be protected from contamination. Likewise, in the event that contaminated groundwater was encountered during any construction or demolition activities, care would be taken to ensure that workers were protected from potentially contaminated groundwater. If this was to occur, the Environmental Flight at Tyndall AFB would need to be notified.

4.3.8.2.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.8.2.

4.3.8.2.3 Potential Development Alternative

Impacts for the PDA would be the same as those described for the Proposed Action, with the exception that the amount of increased impervious cover would be greater. The conceptual development called for under this alternative would result in a 983-acre increase in impervious cover on the installation. While this is a substantial increase in impervious cover, it represents less than four percent of the overall land area of Tyndall AFB and would not be expected to substantially decrease the amount of groundwater recharge to the underlying aquifer.

4.3.8.2.4 Measures to Reduce Impacts

To mitigate the potential for the decrease in quantity of groundwater as a result of the Proposed Action or the PDA, porous pavement could be utilized along with keeping trees or plants with a deep root system in order to increase the amount of water infiltrated into the groundwater system. However, there would be no change to the quality of groundwater resources as a result from the Proposed Action, PDA, or the No-action Alternative; therefore, no mitigative actions would be required for water quality. As previously mentioned, if groundwater is encountered during construction activities, care would be taken to ensure that groundwater resources are protected from contamination.

Proposed development activities should be conducted in a manner that does not structurally impair, reduce the flow of, or increase sediment loading of any on-site or adjacent waterbodies. Construction buffers should be maintained at all times and may include staked hay bales, staked filter cloth, and planting of native species. Use of fertilizers, pesticides, and herbicides should be avoided to maintain groundwater quality. No other mitigative actions would be required.

4.3.8.3 Floodplains

4.3.8.3.1 Proposed Action

Floodplains are present along the coastal and east southeast boundaries of Tyndall AFB. The proposed construction and demolition activities are not located within the delineated 100-year floodplains. Since no activities would take place within the 100-year flood plains there would be no impact.

4.3.8.3.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.8.3.

4.3.8.3.3 Potential Development Alternative

Impacts for the PDA would be the same as those described for the Proposed Action. The additional construction and demolition activities would not be located within delineated 100-year flood plains.

4.3.8.3.4 Measures to Reduce Impacts

Since there would be no impacts to floodplains as a result from the Proposed Action, PDA, or the No-action Alternative, no mitigative actions would be required.

4.3.9 Hazardous Materials and Wastes

The degree to which proposed construction and demolition activities could affect the existing environmental management practices was considered in evaluating potential impacts to hazardous materials and wastes, including ERP sites. Significant impacts could result if nonhazardous regulated or hazardous substances were collected, stored and/or disposed of improperly.

4.3.9.1 Proposed Action

4.3.9.1.1 Hazardous Materials

The use of hazardous materials during the implementation of the Proposed Action is expected to be limited to construction vehicle maintenance (fuel, oils, and lubricants) activities, construction materials (adhesives, sealants, etc.), and additional aircraft maintenance activities (fuel, oils, lubricants, corrosion removers, and paint). These materials would be required to be properly contained, manifested, and managed in accordance with all federal, state, and local regulations, AFIs, and DoD Directives. Authorization from the Tyndall AFB Hazardous Materials Office would need to be acquired prior to use of hazardous materials.

4.3.9.1.1.1 Asbestos

ACM is potentially present in all Tyndall AFB buildings. The guidelines present in the Tyndall AFB Asbestos Management Plan would be followed to abate all ACM from the affected facilities prior to demolition activities. A positive long-term impact would occur, due to renovation activities removing ACM currently present. No ACM would be used in the construction of any new facilities.

4.3.9.1.1.2 Lead-Based Paint

LBP must be considered to be present in all facilities constructed prior to 1980. Procedures stated in the Tyndall AFB LBP Management Plan would be followed to properly test and manage facilities that have been found to contain LBP. Prior to renovating or demolishing any facility, the Lead Based Paint Program Office must be contacted so a LBP survey may be conducted. LBP may be present within the soils surrounding the facilities. If it is necessary to

remove soils for off-site disposal, a limited number of random samples would be collected to assess the presence or absence of lead in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations. Long-term impacts resulting from this alternative would be positive in the removing of LBP and LBP-contaminated soils.

New personnel and dependents would need to be informed of the potential presence of LBP within current MFH located at Tyndall AFB prior to their residency.

4.3.9.1.1.3 Pesticides

Currently, the Tyndall AFB Pest Management Plan applies only to commercially available pesticides. Base records indicate the historical application of several pesticides that are no longer approved for use. Although these pesticides were used in accordance with manufacturers' guidance and directions, the potential exists for residual concentrations in the soil underlying on-base facilities. If it is necessary to remove soils for off-site disposal, a limited number of random samples would be collected to assess the presence or absence of pesticides in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations. Long-term impacts resulting from the Proposed Action would be positive in the removing of pesticide contaminated soils, if contaminated soils were found.

4.3.9.1.2 Hazardous Waste

During demolition activities associated with the Proposed Action, any ACM- and LBP-containing materials removed would be managed in accordance with established installation management plans and state and federal regulations. As described in Section 4.3.9.1.4, a limited number of soil samples should be collected to ascertain the presence or absence of pesticides and lead so that any excess soil may be disposed of in accordance with applicable state and federal regulations. No negative short- or long-term impacts to hazardous waste resulting from this alternative were identified. Positive impacts would include the proper disposal of abated LBP, ACM, and LBP- and/or pesticide-contaminated soils, thereby decreasing potential human contact with those materials.

4.3.9.1.3 Environmental Restoration Program

As described in Section 3.3.9.3, there are four ERP sites located within one-half mile of proposed demolition and construction activities. Of these four ERP sites, three are undergoing remediation activities, and one is currently undergoing remedial investigation. Per the installation General Plan, under Air Force regulations, any major development under the military construction program (MILCON) on or near a contaminated site (ERP or Compliance site) would require a Major Command waiver. Any minor construction or ground disturbing activities would require a base waiver. During Proposed Action activities, monitoring wells must be protected and if wells need to be removed, Tyndall AFB Environmental Flight must be contacted. By following protocol, proposed construction and demolition activities are not be expected to impact any active ERP sites. It is unlikely that construction activities under the Proposed Action would encounter groundwater. If groundwater were encountered during construction activities related to the Proposed Action, care would be taken to ensure that groundwater resources and human health were protected from potentially contaminated groundwater.

There are three MMRP sites located within a one-half mile of proposed demolition and construction activities. These three MMRP sites are scheduled to undergo additional delineation in 2009. If construction or demolition activities occur adjacent to or in these areas, a waiver from Environmental Flight must be obtained prior to commencing activities.

4.3.9.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.9.

4.3.9.3 Potential Development Alternative

Under the PDA, the impacts would be the same as those described for Proposed Action, except that additional aircraft maintenance and industrial facilities would be constructed, resulting in an increase in the hazardous waste stream. None of the additional development above and beyond the Proposed Action projects would be located within one-half mile of any ERP or MMRP sites. According to the Tyndall AFB General Plan, waivers would need to be obtained and monitoring wells protected.

4.3.9.4 Measures to Reduce Impacts

Impacts with regard to hazardous materials and wastes would not be expected from the proposed or alternative actions. All hazardous materials and wastes would be managed according to established plans and state and federal regulations. Therefore, no mitigative actions would be required.

Impacts with regard to the ERP sites would not be expected from the proposed or alternative actions. As noted above, in the unlikely event groundwater was encountered, care would be taken during demolition and construction activities to ensure that groundwater resources are protected from contamination. Likewise, in the event groundwater is encountered during new construction, care would be taken during construction activities to ensure that workers are protected from contaminated groundwater. Per the installation General Plan, under Air Force regulations, any major development under the MILCON on or near a contaminated site (ERP or Compliance site) would require a Major Command waiver. Any minor construction or ground disturbing activities would require a base waiver. If monitoring wells become threatened, the Tyndall AFB Environmental Flight must be called.

4.3.10 Safety

Impacts to the safety of personnel, residents, and visitors could be considered significant if the proposed or alternative actions resulted in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

4.3.10.1 Proposed Action

Ground and Traffic Safety. Changes to daily base activities and vehicular operations, including the addition of construction personnel on base, additional vehicles entering and exiting the base

for construction operations, and the addition of heavy machinery/construction equipment to the base would result in a short-term increase in the potential for more accidents to occur. Furthermore, construction and demolition activities may require pedestrian and traffic detours. Effective communication to installation personnel regarding changes to traffic activities and unsafe areas would be necessary in order to minimize day-to-day pedestrian and traffic hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

Construction Safety. A short-term increase in the potential for construction-related accidents would be expected due to the temporary increase in construction and demolition activities on the installation. Construction and demolition contractors would be required to establish and maintain safety programs that would provide protection to their workers and limit the exposure of base personnel to construction and demolition hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

4.3.10.2 No-action Alternative

Under the No-action Alternative, conditions would remain at the baseline condition described in Section 3.3.9. No impacts to safety at Tyndall AFB would be expected.

4.3.10.3 Potential Development Alternative

Ground and Traffic Safety. The potential for activity on undeveloped land may occur on Tyndall AFB property. Changes in daily on-base activities due to construction would result in a short-term increase in the potential for more accidents to occur; however, because construction may occur on undeveloped property that is not used for daily military activities, accidents may be less likely to involve military personnel. The increase in population would also result in a long-term increase in the potential for more traffic accidents to occur. As with the Proposed Action, effective communication to installation personnel regarding changes to traffic activities and unsafe areas would be necessary in order to minimize day-to-day pedestrian and traffic hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

Construction Safety. Short-term increases in construction-related accidents would be comparable to those under the Proposed Action due to the increased construction activities.

4.3.10.4 Measures to Reduce Impacts

Mitigation measures would not be needed under the Proposed Action or alternative actions. Construction contractors would be required to develop and implement safety plans for each construction project.

4.3.11 Infrastructure and Utilities

The following factors were considered in evaluating potential impacts to infrastructure and utilities: (1) the degree to which a utility service would have to alter operating practices and

personnel requirements; (2) the degree to which the change in demands from implementation of the proposed or alternative actions would impact the utility system's capacity; (3) the degree to which a transportation system would have to alter operating practices and personnel requirements to support the action; and (4) the degree to which the increased demands from the proposed program would reduce the reliability of transportation systems. Impacts to utilities could be considered significant if implementation of the proposed or alternative actions resulted in a change in demand which exceeded the capacity of the utility providers. Impacts to transportation systems could be considered significant if implementation of the proposed or alternative actions resulted in a decrease in the level of service provided by transportation systems such that additional development of the systems could not support the increased usage.

To determine the effective population associated with each alternative, Tyndall AFB personnel who would live off-base are weighted by a factor of one-third to represent their average eight-hour per day demand on installation utilities. By calculation, Tyndall AFB currently has an effective population of 4,759 (Table 3-11). Under the Proposed Action and No-action Alternative, this effective population would remain constant, as no additional personnel would be assigned to the installation. Under the PDA, an additional 5,184 personnel would be added to the installation, with approximately 3,750 of those living off base. Based upon the current ratio of on-base personnel to dependents, there would be an additional 3,011 dependents living on-base under the PDA. As a result, the effective population under the PDA would be 10,441 (Table 4-8).

Table 4-8 Tyndall AFB Effective Population Under the PDA

Category	Population	Effective Population Factor	Effective Population
PDA On-base Personnel (24-hr population)	4,445	1.00	4,445
PDA Off-base Personnel (8-hr population)	3,750	0.33	1,237
Current Population	9,553	--	4,759⁽¹⁾
Total	17,748	--	10,441
Notes: (1) From Table 3-11 hr – hour			

To determine the per capita usage of a utility, the historical data is reviewed (i.e., annual usage of potable water) and then divided by the effective population. The number generated is the annual per capita usage of that utility. When utilizing an effective population to determine utility usage statistics, it must be noted that the historical usage numbers include all domestic, industrial, commercial, and public use. Including these types of usages creates a higher value and does not represent an actual "per person" consumption rate for the installation.

4.3.11.1 Potable Water

4.3.11.1.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in potable water usage as a result of the Proposed Action. Additionally, there would be no mission change that would require additional potable water usage. Demolition and construction of facilities, as described in Section 2.3.2, have the potential to result in an increase in potable water consumption as a result of dust suppression activities and facility related usage. However, this increase cannot be quantified and would be both short- and long-term. Construction of facilities which would include extensions or connections of potable water lines would require permits from the FDEP (for lines greater than 12 inches in diameter), or from the local Department of Health (for lines less than 12 inches in diameter).

The short-term increase would be due to dust suppression activities. Long-term increase in potable water usage would potentially be from installation of air conditioning systems, landscaping of new turf areas and ornamental landscaping, and installation of other water utilizing devices associated with new facilities. There is currently sufficient potable water capacity at Tyndall AFB and Bay County to accommodate this increase in potable water consumption.

4.3.11.1.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.1.

4.3.11.1.2 Potential Development Alternative

Impacts for the PDA would include an increase of 5,184 personnel and an increase of 2,286,179 square feet of new facilities. These activities would result in a short and long-term increase in potable water consumption.

The increase of 5,184 personnel and 3,011 dependents would result in a long-term increase in potable water consumption at Tyndall AFB. Based upon the incoming effective population of 5,682 personnel and dependents, there would be an increase in potable water usage by approximately 1.16 MGD, or 119 percent. The additional construction would increase both the short-term and long-term potable water usage. The short-term increase in potable water usage would be the result of dust suppression activities. The long-term impacts would be the result of increased square footage creating an increase in landscaping of new turf areas and ornamental landscaping and installation of other water utilizing devices associated with new facilities. Construction of facilities which would include extensions or connections of potable water lines would require permits from the FDEP (for lines greater than 12 inches in diameter), or from the local Department of Health (for lines less than 12 inches in diameter). The new total potable water usage would still remain within the capacity of the installation's distribution system and the Bay County's water allotment.

4.3.11.2 Sanitary Sewer

4.3.11.2.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in wastewater generation. Construction of facilities, as described in Section 2.3.2, would have the potential to result in an increase in potable water consumption as a result of facility-related usage, creating an increase in wastewater generation (i.e., bathroom facilities and break rooms). Although this increase cannot be quantified, the AWTP currently operates at eight percent of its capacity (USAF 2008b). This leaves sufficient remaining capacity to allow for additional installation development under the Proposed Action. Construction of facilities which would include extensions or connections of sanitary sewer lines would require permits from the FDEP (for lines greater than 12 inches in diameter), or from the local Department of Health (for lines less than 12 inches in diameter).

4.3.11.2.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.2.

4.3.11.2.2 Potential Development Alternative

Impacts for the PDA would include an increase of 5,184 personnel and 3,100 dependents and an increase of 840,000 square feet of facility space. These activities would result in a long-term increase in wastewater generation. Based upon the incoming effective population, there would be a long-term annual increase of approximately 73,866 gpd, or 13 percent of wastewater generated. As with the Proposed Action, construction of new facilities would have the potential to result in an increase in potable water consumption as a result of facility related usage, creating an increase in wastewater generation. Although this increase cannot be quantified, the Bay County AWTP currently operates at eight percent of its capacity (USAF 2008b). The new total wastewater generation would still remain within the capacity of the AWTP. Construction of facilities which would include extensions or connections of sanitary sewer lines would require permits from the FDEP (for lines greater than 12 inches in diameter), or from the local Department of Health (for lines less than 12 inches in diameter).

4.3.11.3 Solid Waste

The degree to which the proposed construction, demolition, and renovation activities could affect the existing solid waste management program is the overall factor when determining potential impacts. The solid waste generated during construction, demolition, and renovation activities would consist of materials such as solid pieces of concrete and asphalt, metals, and lumber. The contractor would be responsible for disposing of solid waste in accordance with all federal, state, and local laws. A significant impact could occur to solid waste management systems if the amount of solid waste generated from the Proposed Action or PDA exceeded the capacity of the Steelfield Landfill.

4.3.11.3.1 Proposed Action

Under the Proposed Action there would be no mission change. Construction, renovation, and demolition activities associated with the Proposed Action would result in a short-term increase in solid waste generated at Tyndall AFB. It is assumed that all projects would be completed within one year of their start date and that generation of solid waste would be spread out over each year of construction. Table 4-9 shows the estimated construction and demolition waste that would be generated as a result of construction and demolition activities associated with the Proposed Action for each year of construction.

Table 4-9 Solid Waste Generation from Construction and Demolition Activities Associated with the Proposed Action

Fiscal Year of Project	Project Type	Area Affected (SF)	Rate of Debris (lb/SF) ^(a)	Estimated Solid Waste Generated from Action (Tons)	Total Waste Generated Each Year
2009	Construction	22,500	3.89	44	6,511
2009	Demolition	83,452	155	6,468	
2010	Construction	343,653	3.89	668	15,153
2010	Demolition	186,891	155	14,484	
2011	Construction	0	3.89	0	9,288
2011	Demolition	119,843	155	9,288	
2012	Construction	570,372	3.89	1,109	13,693
2012	Demolition	162,377	155	12,584	
Total					44,645
Notes: SF = square feet lb/SF = pounds per square foot ^(a) USEPA 1998. Estimated non-residential construction debris rates, as reported in the <i>Characterization of Building-Related Construction and Demolition Debris in the United States</i> , are 3.89 lbs/SF, and non-residential demolition rates are estimated to be 155 lbs/SF. Demolition debris rate include concrete slabs.					

Based on the estimated rates indicated in Table 4-9, approximately 44,645 tons of construction and demolition waste would be generated over the 4-year period of the Proposed Action, or an average of 11,161 tons annually. Considering the current recycling and reuse diversion rate of 96 percent, it is anticipated that only 446 tons of construction and demolition waste would be disposed at the Steelfield Landfill annually. This would equate to a 55 percent increase over current conditions.

The Steelfield Landfill currently receives approximately 109,500 tons of solid waste per year. By combining the amount of municipal solid waste at Tyndall AFB generated by the effective population and construction and demolition waste generated as a result of the Proposed Action, annual increases in the amount of solid waste disposed of at the Steelfield Landfill would average approximately ten percent. Since the Steelfield Landfill has a remaining life expectancy of 42 years, there would be sufficient capacity to handle the short-term increase in solid waste.

4.3.11.3.1 No-action alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.3.

4.3.11.3.2 Potential Development Alternative

The CIP projects would be incorporated into the PDA as discussed in Section 2.4.2. Beyond the Proposed Action projects, the programmed projects identified in Table 2-5 would equate to approximately 282,313 square feet of construction, 29,000 square feet of renovation, and 218,181 square feet of demolition (Table 4-10). Additionally, broad installation expansion would result in approximately 1,038,341 square feet of construction. As a result, the construction waste generated from the renovation, demolition, and construction activities associated with the CIP projects would be approximately 44,645 tons and the waste generation associated with the new facilities (programmed and broad installation development) defined under the PDA would be approximately 19,827 tons.

Table 4-10 Estimated Renovation, Demolition, and Construction Associated with the PDA

	Renovation (SF)	Demolition (SF)	Construction (SF)	Total Solid Waste (Tons) ^(a)
Proposed Action Projects	0	552,563	936,525	44,645
Programmed Projects	29,000	218,181	282,313	17,807
Broad Installation Expansion	0	0	1,038,341	2,020
Total	29,000	770,744	2,167,179	64,472
CIP = Capital Improvements Program PDA = Potential Development Alternative SF = square feet ^(a) -USEPA 1998. Estimated non-residential construction debris rates, as reported in the <i>Characterization of Building-Related Construction and Demolition Debris in the United States</i> , are 3.89 lbs/SF, and non-residential demolition rates are estimated to be 155 lbs/SF. Demolition debris rate include concrete slabs. Non-residential renovation debris rates were unavailable; however, the <i>Characterization of Building-Related Construction and Demolition Debris in the United States</i> provides that, based on the assumption that for non-residential renovation, waste generation per dollar is equal to the residential rate, total non-residential renovation is less than the residential generation by the ratio of dollars spent. Therefore, for purposes of this analysis, the rate of debris generated for residential renovation (24.05 lbs/SF) was used for non-residential renovation				

It is assumed, for the purposes of this analysis that the construction waste generated for the Proposed Action projects would occur between the years 2009 and 2012, and the waste associated with the programmed projects and broad installation development would occur between 2009 and 2013. It is also assumed that generation of solid waste would be spread out over each year of construction. The total construction and demolition waste generated as a result of the PDA would be expected to be 64,472 tons. This equates to an average annual generation of 15,126 tons the first four years (2009 through 2012) and 3,965 tons of additional construction waste in year 2013.

As a result of an additional 5,184 personnel and 3,011 dependents at Tyndall AFB, there would also be a long-term increase in administrative solid waste generated at newly constructed facilities, as well as a long-term increase in municipal solid waste generated in the local area. Based on the effective population increase (5,682 personnel) and the current per capita rate of municipal solid waste generation, it is estimated that an additional 2,290 tons of municipal solid waste would be generated annually as a result of the PDA.

By combining municipal solid waste and construction waste generated as a result of the PDA, the annual increase in the amount of waste disposed of at the Steelfield Landfill would be approximately 17,416 tons between 2009 and 2012 (16 percent annual increase) and 6,255 tons (6 percent increase) in 2013. Since the Steelfield Landfill has a remaining life expectancy of 42 years, there would be sufficient capacity to accommodate both the long-term and short-term increase in solid waste associated with this alternative.

4.3.11.4 Drainage

4.3.11.4.1 Proposed Action

As discussed in Section 2.3.2 the Proposed Action would have the potential to increase impervious cover by 55.41 acres. This is a 6.1 percent increase over current conditions. This increase in impervious cover would be expected to result in a 6 percent or 1,908.17 cfs increase in stormwater runoff. As part of the project planning activities, localized drainage improvements would be considered and incorporated into the planning process. The base-wide drainage system with its seven drainage points is sufficient to accommodate the potential increase in stormwater runoff. Any new storm drainage improvements would be tied into the existing storm drain system and would not impact the Bay County Advanced Wastewater Treatment Plant or the Bay County industrial sewage lagoon. In the event of a storm surge, it is possible that storm water would inundate the industrial sewage lagoon and result in contamination of the lagoon and create potential health risks. In this case, a contingency plan created by Tyndall AFB could reduce the impacts to the lagoon.

4.3.11.4.2 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.4.

4.3.11.4.3 Potential Development Alternative

Impacts would be the same as the Proposed Action except that the PDA would have the potential to increase impervious cover by approximately 983 acres. This increase in impervious cover would be expected to result in a 108 percent or 1,947.05 cubic feet per second increase in stormwater runoff. As part of the project planning activities, localized drainage and infrastructure improvements (i.e. oil water separators, added retention ponds, lift stations, increased pipe size) would be considered and incorporated into the planning process for each project. As such, the base-wide drainage would be sufficient to accommodate the potential increase in stormwater runoff.

4.3.11.5 Transportation

4.3.11.5.1 Proposed Action

There would be an intermittent, short-term increase in traffic counts associated with a variety of tradespersons entering the installation on a daily basis to accomplish construction and demolition activities but these would not be expected to exceed the capacity of existing roads on the installation. Increased traffic counts would be expected in the early morning as workers arrive at

their job site and in the early evening as workers depart for the day. This would typically coincide with the normal commuting patterns of Tyndall AFB.

Transportation of heavy equipment, materials, and roll-off dumpsters to and from the construction locations would add additional short-term traffic on the installation and on public roads that connect to the installation. The heavy loads that would be expected from this type of traffic could affect road surface conditions if the roadway section is not adequate to support continued heavy equipment traffic for an extended period. Repair of small roadway sections may be required following completion of the construction projects.

4.3.11.5.2 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.5.

4.3.11.5.3 Potential Development Alternative

The PDA would include an increase in the transportation as a result of an increase in 5,184 personnel and 3,011 dependents, and an increase in construction activities. Impacts related to construction activities would be the same as for the Proposed Action, except that the increase in construction related traffic would occur through the year 2013. The increased traffic related to personnel would be long-term. Additionally, personnel and dependents residing on the installation would increase on-base traffic and parking requirements. It is anticipated that these requirements would be met by the general installation development under the PDA.

4.3.11.6 Electricity and Natural Gas

4.3.11.6.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in electricity or natural gas usage as a result of the Proposed Action. Construction of new facilities, as described in Section 2.3.2, would have the potential to increase energy consumption as a result of facility related usages. Although this increase cannot be quantified, this long-term increase in energy usage would result from use of heating, ventilation, and air conditioning systems; lighting; computers; and additional energy-consuming devices associated with the new facilities. As stated in Section 3.3.10.6, Gulf Power Company and TECO would have sufficient capacity to meet the current and projected natural gas and electricity demands of Tyndall AFB (Aycock 2008 and McGuire 2008).

4.3.11.6.2 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.10.6.

4.3.11.6.3 Potential Development Alternative

Impacts for the PDA would include an increase of 5,184 personnel and 3,011 dependents as well as an increase of 2.3 million square feet of new facilities. These activities would result in a long-term increase in electrical and natural gas consumption.

Based on the effective population increase (5,682 people), there would be an annual long-term increase of approximately 150,933 MWh of electricity or an increase of 119 percent, and a natural gas consumption increase of 124,436 kcf or an increase of 127 percent. The total annual electricity usage for Tyndall AFB would be approximately 277,348 MWh and the total natural gas usage would be 221,827 kcf. The additional construction would also increase long-term electrical usage and, although this increase cannot be quantified, the per capita rates associated with incoming personnel account for some of the additional energy required to power HVAC, lighting, computers, and additional energy using devices associated within the additional facilities (see explanation of per capita rates in Section 4.3.10). As stated in Section 3.3.10.6, Gulf Power Company and TECO would have sufficient capacity to meet the current and projected natural gas and electricity demands of Tyndall AFB (Aycock 2008 and McGuire 2008).

4.3.11.7 Measures to Reduce Impacts

All utility providers and utility systems at Tyndall AFB have sufficient capacity to accommodate an increase in consumption or generation associated with the Proposed Action, PDA, and the No-action Alternative. Therefore, no measures are necessary to reduce impacts. BMPs such as implementation of water and energy saving devices in new facilities and recycling of construction, demolition, and renovation wastes would help to offset utility consumption and solid waste generation. Also, low impact development approaches to design and stormwater management, such as using concrete grass pavers instead of solid concrete and use of Florida-friendly landscaping, are other BMPs which would reduce stormwater runoff and non-point source pollution of water resources. A contingency plan created by Tyndall AFB could reduce impacts to the industrial sewage lagoon from a storm surge.

4.3.12 Socioeconomic Resources

The analysis for socioeconomic resources is based on the following criteria:

Population. The degree to which changes in the population of Tyndall AFB personnel or in the surrounding community would place pressures on community services, transportation, or infrastructure in that community;

Housing. The degree to which an influx of people and construction in the local community would affect available and suitable housing, or a large amount of housing development, in that community;

Education. The ability of the local school system to absorb an influx of students over a short period of time, and continue to provide a suitable education to these children; and

Economy. The degree to which a change in the local population and activities would affect employment rates, job availability, and either a gain or loss of business exchange in the local community.

Impacts would be considered significant if there was an increase in population such that:

- community services, transportation, or infrastructure could not be expanded to meet the needs of the expanded population,
- sufficient housing could not be constructed to accommodate the incoming population,
- existing schools were not available to absorb an influx of students and sufficient additional schools could not be constructed to accommodate those students, or
- long-term employment rates decreased, the amount of local business decreased, or the increase in population exceeded the projected growth rate for the statistical area.

4.3.12.1 Proposed Action

Population. Under the Proposed Action, no new personnel would be assigned to Tyndall AFB; therefore, there would be no change to the total population of Tyndall AFB.

Housing. Under the Proposed Action, no new personnel would be assigned to Tyndall AFB and the housing capacity would not be affected. It is assumed demolition of currently occupied dormitories would not occur until the construction of the 120-person dormitory complex is complete. Therefore, no unaccompanied personnel would be displaced and there would be no negative effects to housing under the Proposed Action.

Education. No new personnel would be assigned to Tyndall AFB; therefore, there would be no change in area school populations under the Proposed Action.

Economy. Under the Proposed Action any construction and demolition of facilities would begin in 2009 and would be completed by 2012. The local economy would benefit from expenditures incurred during construction and demolition activities. Table 2-2 indicates when each project is projected to begin and for purposes of analysis, it is anticipated that each project would be completed in the year in which it begins. Due to this schedule, economic impacts associated with construction would be expected to vary as the construction periods begin and end.

4.3.12.2 No-action Alternative

Population. Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.11.1. Therefore, there would be no impact to population.

Housing. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.11.2. Therefore, there would be no impact to housing.

Education. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.11.3. Therefore, there would be no impact to education.

Economy. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.11.4. Therefore, there would be no impact to economy.

4.3.12.3 Potential Development Alternative

Population. Under the PDA, there would be an additional 5,184 personnel and 6,133 dependents (3,122 living off-base and 3,011 living on-base) added to Tyndall AFB and the surrounding area. While some of these personnel and dependents would be relocating to the area, the civilian component of the increase in installation population would likely draw heavily from the existing regional employment pool; however, an exact percentage of local employment is not known. It is unknown what amount of personnel will be accompanied or unaccompanied, military or civilian. For purposes of calculation of dependents it is assumed that of the 6,133 dependents, 2,933 are spouses, and 3,200 are children. The projected growth for Bay County from 2007 to 2014 is 8.5 percent, or a 14,355 person increase (CHARTS 2008). The number of personnel and their dependents falls within the projected growth rate for Bay County and therefore, this increase to local population would not affect the ability of public services, transportation, or infrastructure to effectively support the community.

Housing. Under the PDA, an additional 5,184 personnel and 3,011 dependents would be added to Tyndall AFB. Approximately 3,750 of the incoming personnel (and their dependents) would live off base. As a result, there would be a long-term increase in accompanied housing requirements on and off base and a long-term increase in unaccompanied housing requirements on base. Civilian employees that are already included in the Bay County population are amongst the additional personnel arriving at Tyndall AFB and because they are current residents of Bay County, housing needs for these personnel have already been established. According to the HRMA, in 2006 there were an estimated 828 vacant, suitable rental units available. The long-term impacts associated with the substantial increase in personnel would be offset by construction of housing at Tyndall AFB under the broad installation development component of the PDA. Based upon current growth projections for Bay County, private sector construction would also respond to an increased housing demand in the surrounding communities. As such, adequate housing on and off base would be expected to be available to accommodate the population increase associated with the PDEA.

Education. Under the PDA, there would be a long-term increase in area school populations due to the enrollment of an estimated 3,200 children in the Bay District Schools. Civilian employees that are already included in the Bay County population are amongst the additional personnel arriving at Tyndall AFB and because they are current residents of Bay County, their children are already enrolled in the Bay District Schools. The grade distribution of the additional students is unknown; however, current capacities at Bay District Schools indicate that all schools in the district could accommodate the additional 3,200 students during a five year period.

New families assigned to Tyndall AFB would enroll their children in the Bay District Schools. It is assumed that elementary age children would be enrolled at Tyndall Elementary School, and older students would be enrolled at Rosenwald Middle School and Rutherford High School. Based on the information provided by the Bay District School system, these schools may reach capacity due to the additional children. If these schools were to reach capacity, it is assumed the children would be bused to nearby schools in the same district.

Economy. Expenditures incurred during construction would result in short-term positive impacts to the local economy. Also, the addition of 11,317 individuals to the local community would result in a long-term positive impact.

4.3.12.4 Measures to Reduce Impacts

There are no mitigation measures required as a result of the Proposed Action or the PDA.

4.3.13 Environmental Justice

As discussed in Section 3.3.13, the Air Force has issued guidance on environmental justice analysis as a part of the EIAP. In order to comply with EO 12898, ethnicity and poverty status in the study area have been analyzed. The ROI for each resource area has been evaluated within the COC in order to identify the presence or absence of environmental justice populations. The ROI for the resources (i.e., air quality, noise, land use) is the area within the boundaries of Tyndall AFB and Panama City. Given that there is no demographic data available for Tyndall AFB and the fact that there are no minority or low-income populations present at Tyndall AFB, Panama City served as the ROI and its demographic data was used for the analysis. There is an environmental justice population, minority and low-income, present within the area that would be impacted by construction and demolition activities. There are no adverse impacts associated with the proposed or alternative actions; therefore, according to the Air Force's Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process, no further environmental justice analysis is warranted.

4.3.13.1 Measures to Reduce Impacts

There would be no disproportionate adverse impacts to any population as a result from the Proposed Action, PDA, or the No-action Alternative; therefore, no measures to reduce impacts would be required.

4.4 CUMULATIVE EFFECTS

Airspace Use and Management

Concurrent actions described in Section 2.6 would not affect airspace resources so cumulative effects would not be different from those presented in Section 4.3.1.

Noise

The other actions described in Section 2.6 would not adversely affect the natural or man-made environment as a result of increased noise exposure. They are principally construction projects of temporary duration, dispersed over a large military installation. In aggregate, their noise impact would not be appreciably different from those projects that are part of the proposed and alternative actions. The construction noise on the installation would not extend off the installation and would not be the major contributor to the noise setting at Tyndall AFB. Therefore, when considering the Proposed Action or the PDA in conjunction with those projects

presented in Section 2.6, the effects would be of short duration and would not influence the cumulative noise exposure metric.

Land Use

Projects described in Section 2.6, when considered with the action alternatives, would not adversely affect land use resources. The projects identified are all on-base and would be undertaken in conformance with Air Force regulations and sound planning principles. They previously have been or will be assessed under separate NEPA documentation, with their effects analyzed and disclosed. Their development is presumed consistent with the General Plan and their effect on land use resources is expected to be found to not be significant.

Air Quality

Air emissions from projects described in Section 2.6 would be localized, primarily short-term in nature, and associated with construction/demolition activities. Long-term emissions from these projects are not anticipated to increase due to the new equipment being more efficient and having lower emissions than the equipment currently present.

The short term increase in emissions is not significant when compared to the total Panama City-Lynn Haven MSA annual emissions.

Earth Resources

The projects discussed in Section 2.6 are similar in scope and scale to those in the Proposed Action and the PDA. The soils in the vicinity of the proposed construction projects at Tyndall AFB have been altered over time and the project area is disturbed with existing facilities and paved roads. Potential cumulative effects would include an increase in soil disturbance associated with construction activities. The impacts would be minimized by the use of BMPs to minimize soil erosion.

Biological Resources

The proposed and alternative actions would have a minimal impact on the current distribution, range, and abundance of wildlife on Tyndall AFB since the majority of these activities are occurring in developed areas of the installation. However, if this growth were to continue, it is expected there would be an increase in human-wildlife interactions, enzootic diseases, and invasive species. Fragmentation of suitable wildlife habitat, alteration of hydrology, and incidental take of certain species would cause the size of several plant and animal populations to decline. Future planning will be needed to determine how new development might alter wildlife populations and in order to make sound management decisions regarding listed species.

Cultural Resources

Any potential adverse effects to significant archeological resources under the Proposed Action or PDA would be reduced through data recovery; thus, there would be no potential for cumulative impacts. Any potential adverse effects to significant historic resources under the Proposed

Action or PDA would be addressed through documentation determined in consultation with the SHPO; thus, there would be no potential for cumulative impacts.

Water Resources

The projects identified in Section 2.6 would create an additional 3.4 acres of impervious cover on Tyndall AFB. Surface water management would present the main issue of concern regarding cumulative impacts. In the short term, construction and shallow excavation required during construction activities for the Proposed Action, PDA, and concurrent projects that would occur at Tyndall AFB would primarily require addressing sediment control and runoff. In the long term, additional surface water runoff would be caused by an increase in impervious surface, associated with installation development. To ensure that the additional overland flow would not impact Tyndall AFB, the base stormwater system must be maintained and potentially expanded to meet the additional capacity. Additionally, the distribution of the increased surface water should reach receiving waters that have the capacity to absorb the increase in surface water and sediment load. To further minimize the short- and long-term impacts, site specific SWPPPs would be implemented along with the base-wide SWPPP. These plans would assist with decreasing sediment load entering into the increased surface water runoff.

Hazardous Materials and Wastes

The proposed and alternative actions, as well as concurrent actions would require the management of ACM, LBP, and transportation of associated hazardous materials and wastes. Management of these materials and waste streams would occur under the existing Tyndall AFB management programs. Therefore, the proposed and alternative actions would not contribute to cumulative effects to hazardous materials and wastes in or around Tyndall AFB.

Safety

No cumulative impacts on safety related to construction and demolition would be anticipated. Implementation of the Proposed Action and the other construction projects at Tyndall AFB would slightly increase the short-term risk associated with the construction contractors performing work at these locations. Contractors would be required to establish and maintain safety programs that would provide protection for their workers and limit the exposure of base personnel to construction hazards.

Utilities and Infrastructure

None of the other projects scheduled to occur during the same time as the Proposed Action or PDA would contribute to a change in population. Therefore, these concurrent projects would not contribute to an overall per capita increase in potable water consumption, sanitary waste generation, electrical, and natural gas consumption resulting from the Proposed Action and PDA. However, the creation of additional square footage as a result of the other projects would increase potable water consumption, sanitary waste generation, electrical, and natural gas consumption. The increase in facility usage is not quantifiable; however, none of the utility systems at Tyndall AFB are currently constrained. Therefore, it is not anticipated that an increase in utilities consumption/generation would impact the system's capacity.

The additional projects would also increase solid waste generation and would contribute to the temporary short-term increase in traffic resulting from construction, renovation, and demolition activities. The increase in traffic would be due to transportation of heavy equipment, materials, and roll-off dumpsters to and from the construction locations. This would increase the deterioration of roadways already projected from the Proposed Action and PDA. Additional impervious cover constructed as a result of the concurrent actions would contribute to an increase in stormwater runoff resulting from the Proposed Action and PDA. The concurrent actions described in Section 2.6 would generate approximately 107,328 tons of solid waste over the life of those projects. Since the Steelfield Landfill has a remaining life expectancy of 42 years, there would be sufficient capacity to handle the short-term increase in solid waste.

Socioeconomics Resources

No projects scheduled to occur at the same time as the Proposed Action or PDA would contribute to a change in population, housing, or education. Therefore, these concurrent projects would not contribute to the overall increases to population, housing, and education requirements resulting from the Proposed Action and PDA.

Environmental Justice

There is no environmental justice population present at Tyndall AFB and no cumulative impacts related to construction and demolition would be anticipated. Any impacts to resources or communities would be contained to the installation and the outside population would not be affected by the occurring actions.

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Chapter 5

List of Preparers

CHAPTER 5 LIST OF PREPARERS

Name/Organization	Degree	Resource Area	Years of Experience
Carlton Hendrix/WESTON	BS, Environmental Engineering; MS Civil Engineering	Project Manager	10
Robin Divine/WESTON	BS Geography; MAG Geography and Environmental Management and Planning	Interim Project Manager	18
Tamara Carroll/WESTON	BS, Bioenvironmental Science	Resource Lead, Utilities and Infrastructure, Document Compilation	7
Elisa Morales/WESTON	BS, Biology	Resource Lead, Socioeconomics, Environmental Justice, Earth Resources	4
Barry Peterson/WESTON	BS Meteorology; MS Atmospheric Sciences	Resource Specialist, Air Quality	8
Kevin Eldridge/WESTON	BS, Meteorology; MS Atmospheric Sciences	Resource Lead, Air Quality	23
Jennifer Peters/WESTON	M.S. Atmospheric Sciences	Resource Lead, Hazardous Materials and Wastes, Water Resources	7
Duane Peter/Geo-Marine, Inc.	BA, History; MA, Anthropology	Resource Lead, Cultural Resources (Archaeological Resources)	34
Marsha Prior/Geo-Marine, Inc.	BA, Sociology; MA, Anthropology; PhD, Anthropology	Resource Lead, Cultural Resources (Historic Resources)	18
John R. Ouellette/Geo-Marine, Inc.	BS, Biology; MS, Entomology	Resource Lead, Biological Resources	17
Darrell Pennington/Geo-Marine, Inc.	BS, Professional Aeronautics	Resource Specialist, Airspace Use and Management, Noise	20
Kurt Hellauer/Geo-Marine, Inc.	BA, Government	Resource Lead, Airspace Use and Management, Noise	18

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Chapter 6

List of Persons and Agencies Consulted

CHAPTER 6 LIST OF PERSONS AND AGENCIES CONSULTED

Federal Agencies

Federal Emergency Management Agency
Brad Loar, Chief of Community Mitigation Programs Branch

National Marine Fisheries Service
Mark Thompson, National Marine Fisheries Service

Tyndall AFB
Jose Cintron (325 CES/CEV)
Steve Hamilton (325 CES/CEV)
Steve McLellan (325 CES/CEV)

US Army Corps of Engineers
Public Affairs

US Fish and Wildlife Service
Janet Mizzi, Ecological Services

Schools

Rosenwald Middle School
Darnita Rivers, Assistant Principal

Rutherford High School
Pat Shaw, Assistant Principal

Tyndall Elementary School
Susan Ross, Assistant Principal

Florida State Agencies

Florida Department of State
Laura Kammerer, Historic Preservationist Supervisor

State of Florida Department of Community Affairs
Susan Poplin, State of Florida Department of Community Affairs

Other Agencies and Individuals

Bay County Emergency Management Office
Mark Bowen, Chief of Emergency

Bay County Utility Services
Larry Moyer, Wastewater Superintendent

Chickasaw Nation
Bill Anoatubby, Governor

Choctaw Nation of Oklahoma

City of Panama City
Michael Johnson, Director

Creek Capital Complex
Lester Wiggins, Creek Capital Complex

Gulf Power Company
Bill Aycock, Operations Manager, Gulf Power Company

Miccosukee Tribe of Indians of Florida
Billy Cypress, Chairman

Mississippi Band of Choctaw Indians
Miko Beasley Denson, Chief

Panama City Utilities Department
Ron Morgan, Director of Underground Utilities

Poarch Band of Creek Indians
Buford Rolin, Chairperson

Seminole Nation of Oklahoma
Enoch Kelly Haney, Chief

Seminole Tribe of Florida
Mitchell Cypress, Vice President

TECO People's Gas
Mike McGuire, Division Manager, Panama City Area

Chapter 7

References

CHAPTER 7 REFERENCES

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General Plan-Based Environmental Impact Analysis Process Environmental Assessment Volume II - Appendices



Tyndall Air Force Base



**United States Air Force
Air Education and Training Command
325th Fighter Wing
Tyndall Air Force Base, Florida**

September 2009

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Appendix A – Interagency/Intergovernmental Coordination for Environmental Planning and
Public Participation

Appendix B – Capability Analysis

Appendix C – Air Emissions Calculations for Tyndall AFB

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Appendix A

Interagency/Intergovernmental Coordination and Public Participation

General Scoping Letter Example

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

SHIPPED OCT 15 2008

Mr. Joseph V. McLernan
325th Civil Engineer Squadron
119 Alabama Ave
Tyndall AFB, FL 32403-5014

Chief Miko Beasley Denson
Mississippi Band of Choctaw Indians
101 Industrial Road
Choctaw, MS 39350

Dear Chief Denson,

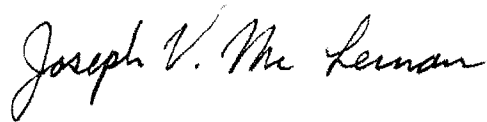
The 325th Fighter Wing at Tyndall Air Force Base (AFB), Florida, is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). We propose actions to accommodate the development of the installation based upon the Capital Improvements Program (CIP) in our installation General Plan. The General Plan requirements define the plan for potential facilities and associated site improvements in support of the existing missions at Tyndall AFB. These projects would improve the effectiveness of training, enhance quality of life, replace old inadequate facilities, correct current deficiencies, and accommodate new mission activities.

Three alternatives will be considered including the Proposed Action, the Potential Development Alternative, and the alternative to take no action. The Proposed Action includes facility and infrastructure improvements including eleven facilities planned for construction and 71 facilities and associated paved areas planned for demolition. The Potential Development Alternative is development of the installation beyond the Proposed Action based on vacant parcels of land on the installation.

We solicit comments and concerns regarding the proposal so that we might address them in our analysis. When completed, the Draft EA will be forwarded for your review. A list of agencies contacted is attached. Please let us know if you feel additional agencies should review the proposal.

To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects. Any questions regarding this proposal should be directed to Mr. José J. Cintron at 850-283-4341. Please forward your written comments by 13 November 2008 to Mr. Cintron at 119 Alabama Ave. (Stop 42), Tyndall AFB, FL, 32403; email: jose.cintron@tyndall.af.mil.

Sincerely,

A handwritten signature in black ink that reads "Joseph V. McLernan". The signature is written in a cursive style with a large, stylized 'J' and 'M'.

Joseph V. McLernan
Chief, Asset Management Flight

4 Attachments:

1. List of projects identified for the Proposed Action
2. List of Agencies Contacted
3. Figures 1 and 2 - Proposed Action Construction Projects
4. Figure 3 - Proposed Action Demolition Projects

Enclosures for Scoping Letter

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Proposed Action Demolition and Construction Project List

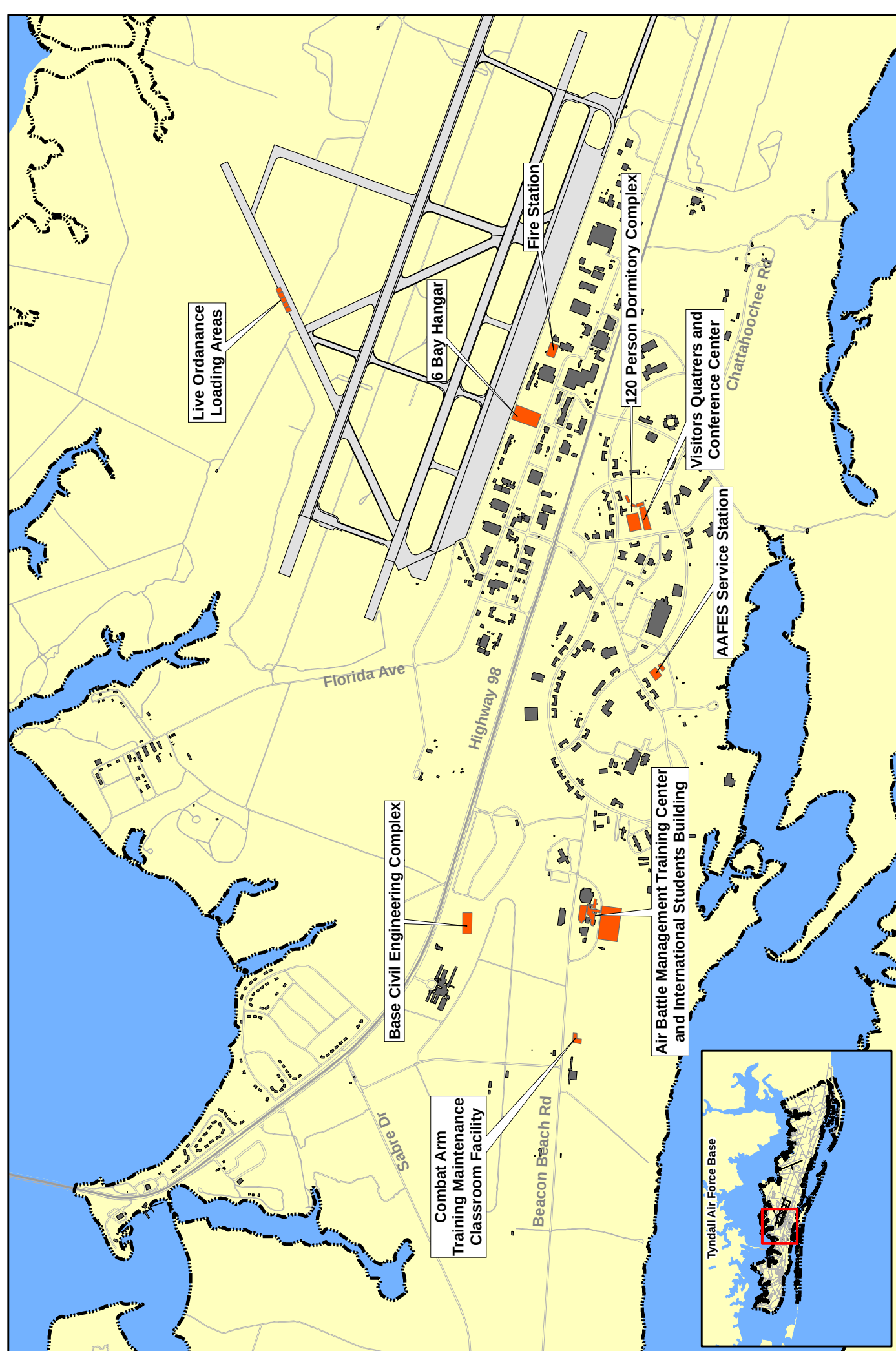
Demolition / Construction	Bldg No.	Bldg Name	Bldg Area (SF)	Yr Constructed
Construction		Fire Station	34,000	
Construction		Combat Arm Training Maintenance (CATM)	8,000	
Construction		Visitors Quarters Billeting and Conference	90,000	
Construction		Air Battle Management Training Center Su	7,500	
Construction		International Students Building	6,000	
Construction		F-22 Six Bay Hangar	70,000	
Construction		120 person dormitory complex	48000	
Construction		Consolidated Airbase Technologies Divisio	215,439	
Construction		AAFES Service Station	2214	
Construction		Live Ordnance Loading Area (LOLA)	32,452	
Construction		Base Civil Engineer Complex	106,000	
Demolition	529	SHP NAVAID	224	1943
Demolition	535	Tech Training Classroom	3,573	1943
Demolition	653	AFCS Maintenance Fac	6,936	1943
Demolition	656	AFOSI Office	6,936	1943
Demolition	806	Dorm	6,963	1943
Demolition	808	Comm Facility	6,963	1943
Demolition	816	Dorm	6,963	1943
Demolition	1530	Cadet Quarters	6,936	1943
Demolition	1532	Cadet Quarters	6,936	1943
Demolition	1604	Cadet Quarters	6,936	1943
Demolition	1613	Cadet Quarters	3,105	1943
Demolition	471	HQ Administrative Offices	5,079	1943
Demolition	472	HQ Administrative Offices	7,210	1943
Demolition	1027	Recreation Center	18,651	1943
Demolition	1140	HQ Administrative Offices	6,936	1943
Demolition	1125	HQ Administrative Offices	6,936	1943
Demolition	1129	HQ Administrative Offices	6,936	1943
Demolition	1530	Cadet Quarters	6,936	1943
Demolition	1532	Cadet Quarters	6,936	1943
Demolition	1604	Cadet Quarters	6,936	1943
Demolition	1013	Cadet Quarters	6,936	1943
Demolition	1612	Cadet Quarters	6,936	1943
Demolition	1614	Cadet Quarters	6,936	1943
Demolition	444	HQ Administrative Offices	19,362	1943
Demolition	743	Family Support Center	5,701	1943
Demolition	745	Family Support Center	6,936	1943
Demolition	822	HQ Administrative Offices	7,442	1943
Demolition	916	Recreation Library	11,773	1943
Demolition	920	HQ Administrative Offices	6,936	1943
Demolition	1003	Post Office Center	5,614	1943
Demolition	1015	HQ Administrative Offices	6,936	1943
Demolition	449	CE Storage Shed	12,710	1943
Demolition	450	CE Storage Shed	9,000	1943
Demolition	453	CE Maintenance Shop	3,008	1943
Demolition	470	CE Administrative Offices	9,648	1943
Demolition	909	Disaster Preparedness	10,636	1943
Demolition	6014	CE Storage Shed	1,317	1943
Demolition	6016	CE Pav Grnd Facility	1,286	1943
Demolition	6020	CE Storage Facility	3,700	1943
Demolition	6022	CE Maintenance Facility	1,330	1943
Demolition	6027	CE Maintenance Shop	7,728	1943
Demolition	1750	Sewage Treatment Dsplt	0	1945
Demolition	968	AAFES Service Station	2,214	1948
Demolition	1265	Combat Arm Training Maintenance (CATM)	1,819	1950
Demolition	6030	CE Pave Grnd Facility	4,000	1962

Proposed Action Demolition and Construction Project List

Demolition / Construction	Bldg No.	Bldg Name	Bldg Area (SF)	Yr Constructed
Demolition	1352	CE Storage Shed	6,171	1963
Demolition	214	Fire Station	43,104	1965
Demolition	421	CE Administrative Offices	37,897	1969
Demolition	422	CE Storage Shed	612	1972
Demolition	1680	PP Dorm	25,960	1976
Demolition	419	Storage Shed	600	1978
Demolition	451	CE Hazard Storage/Shed	1,482	1978
Demolition	457	CE Storage Facility	1,250	1978
Demolition	458	CE Storage Facility	1,250	1978
Demolition	1350	Latrine	125	1985
Demolition	1149	PP Dorm	33,682	1987
Demolition	1150	PP Dorm	19,987	1987
Demolition	1151	Lounge/Dayroom	2,615	1987
Demolition	1152	PP Dormitory	10,125	1987
Demolition	1153	Lounge/Dayroom	3,315	1987
Demolition	1154	PP Dormitory	10,125	1987
Demolition	1155	Lounge/Dayroom	2,615	1987
Demolition	1156	Tec Trng Student Housing	10,125	1987
Demolition	425	CE Storage Shed	7,000	1988
Demolition	1615	Dorm VAQ	24,111	1989
Demolition	1616	Trng Lodge SPT Bldg	1,681	1989
Demolition	1617	Dorm VAQ	24,111	1989
Demolition	1363	SE Maintenance Shp	144	1990
Demolition	474	CE Maintenance Shop	4,000	1991
Demolition	1127	HQ Administrative Offices	2,600	1992
Demolition	1016	Cadet Quarters	6,936	1998

IICEP Mailing List
GEIAP EA
Tyndall AFB, Florida

Agency	Department	Title	Title-1	First Name	Last Name	Address	City	State	Zip
US Fish and Wildlife Service	Ecological Services		Ms.	Janet	Mizzi	1601 Balboa Avenue	Panama City	FL	32405
Seminole Tribe of Florida		Vice-President	Chairman	Mitchell	Cypress	6300 Stirling Road	Hollywood	FL	33024
Seminole Nation of Oklahoma			Chief	Enoch Kelly	Haney	P.O. Box 1498	Wewoka	OK	74884
Poarch Band of Creek Indians			Chairman	Buford	Rolin	5811 Jack Springs Road	Atmore	AL	36502
Creek Capital Complex			Mr.	Lester	Wiggins	P.O. Box 580	Oklmulgee	OK	74447
Mississippi Band of Choctaw Indians			Chief	Miko	Denson	101 Industrial Road	Choctaw	MS	39350
Miccosukee Tribe of Indians of Florida				Beasley		P.O. Box 440021	Miami	FL	33144
Choctaw Nation of Oklahoma			Chairman	Billy	Cypress	P.O. Drawer 1210	Durant	OK	74702
Chickasaw Nation			Governor	Bill	Anoatubby	P.O. Box 1548	Ada	OK	74821
Federal Emergency Management Agency	Flood Insurance and Mitigation Division	Chief, Community Mitigation Programs Branch	Mr.	Brad	Loar	3003 Chamblee-Tucker Road	Atlanta	GA	30341
US Army Corps of Engineers	Mobile District			Public	Affairs	109 St. Joseph Street	Mobile	AL	36602
City of Panama City	Community Development Program	Director	Mr.	Michael	Johnson	9 Harrison Avenue	Panama City	FL	32402
Emergency Management Office	Bay County	Chief of Emergency	Mr.	Mark	Bowen	644 Mulberry Avenue	Panama City	FL	32401
State of Florida Department of Community Affairs	Division of Community Planning		Ms.	Susan	Poplin	2555 Shumard Oak Boulevard	Tallahassee	FL	32399-2100
Florida State Clearinghouse	Department of Environmental Protection					3900 Commonwealth Blvd MS 47	Tallahassee	FL	32399-3000
State of Florida	Department of Environmental Protection, District Branch Office - Northwest	Director	Mr.	Dick	Fancher	2353 Jenks Avenue	Panama City	FL	32405
Florida Department of State	Division of Historical Resources, Compliance and Review Section	Historic Preservationist Supervisor	Ms.	Laura	Kammerer	500 S. Brounough Street	Tallahassee	FL	32301
Panama City Utilities Department		Underground Utilities Director	Mr.	Ron	Morgan	2226 Michigan Avenue	Panama City	FL	32405
National Marine Fisheries Service			Mr.	Mark	Thompson	3500 Delwood Beach Road	Panama City	FL	32408



Legend

- Roads, Driveways
Parking Lots, Sidewalks
- Airfield
- Existing Buildings
- Proposed Action Construction Projects
- Water



A-10

Figure 1

Proposed Action Construction Projects

Tyndall Air Force Base, FL

Legend

- Roads, Driveways
- Parking Lots, Sidewalks
- Existing Buildings
- Proposed Action Construction Project
- Water



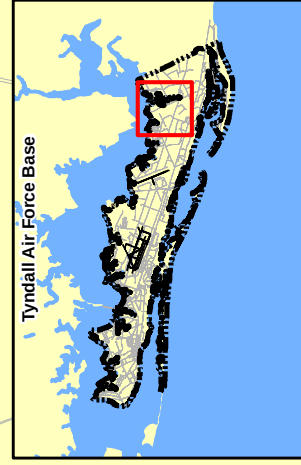
0 750 1,500 Feet

A-11

Figure 2

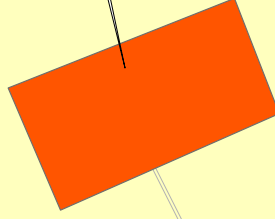
**Proposed Action Consolidated
Airbase Technologies Division Campus**

Tyndall Air Force Base, FL



Highway 98

Consolidated Airbase
Technologies Division Campus



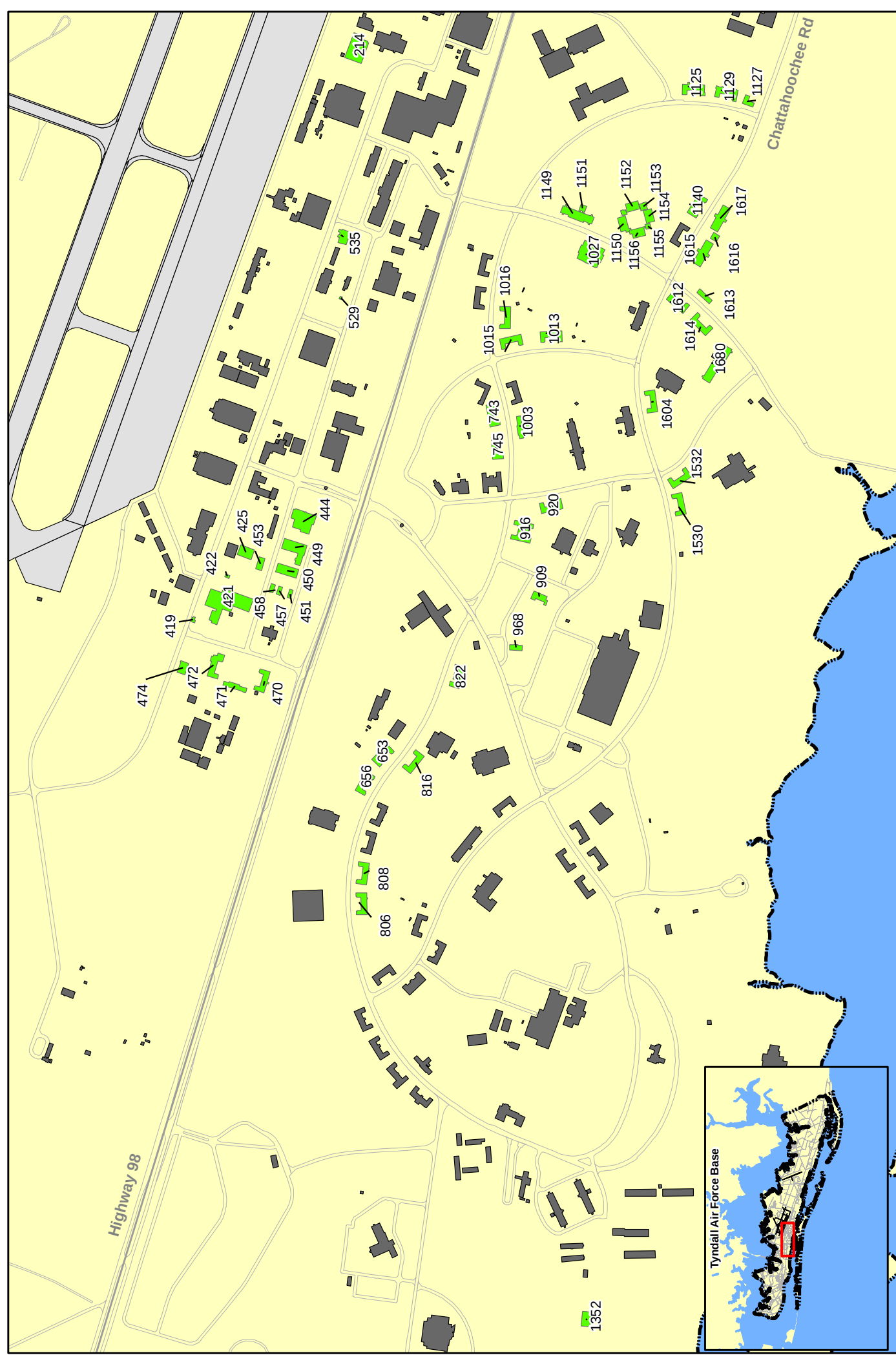


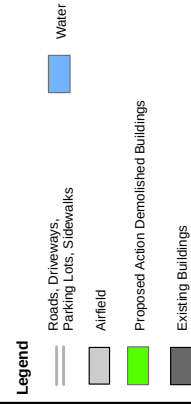
Figure 3

Tyndall Air Force Base, FL



A vertical scale bar labeled "Feet" with markings at 0, 425, and 850. The bar is divided into two sections: a solid black section from 0 to 425 feet, and a white section with a black outline from 425 to 850 feet.

A-12



Final Scoping Mailing List

(no document text this page)

IICEP Mailing List
GEIAP EA
Tyndall AFB, Florida

Agency	Department	Title	Title-1	First Name	Last Name	Address	City	State	Zip
US Fish and Wildlife Service	Ecological Services		Ms.	Janet	Mizzi	1601 Balboa Avenue	Panama City	FL	32405
Seminole Tribe of Florida		Vice-President	Chairman	Mitchell	Cypress	6300 Stirling Road	Hollywood	FL	33024
Seminole Nation of Oklahoma			Chief	Enoch Kelly	Haney	P.O. Box 1498	Wewoka	OK	74884
Poarch Band of Creek Indians			Chairman	Buford	Rolin	5811 Jack Springs Road	Atmore	AL	36502
Creek Capital Complex			Mr.	Lester	Wiggins	P.O. Box 580	Okmulgee	OK	74447
Mississippi Band of Choctaw Indians			Chief	Miko Beasley	Denson	101 Industrial Road	Choctaw	MS	39350
Miccosukee Tribe of Indians of Florida				Billy	Cypress	P.O. Box 440021	Miami	FL	33144
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Chickasaw Nation			Governor	Bill	Anoatubby	P.O. Box 1548	Ada	OK	74821
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Florida State Clearinghouse	Department of Environmental Protection					3900 Commonwealth Blvd MS 47	Tallahassee	FL	32399-3000
State of Florida	Department of Environmental Protection, District Branch Office - Northwest	Director	Mr.	Dick	Fancher	2353 Jenks Avenue	Panama City	FL	32405
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National Marine Fisheries Service			Mr.	Mark	Thompson	3500 Delwood Beach Road	Panama City	FL	32408

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Scoping Responses

(no document text this page)



*"Dedicated to Excellence . . .
People Serving People"*

October 20, 2008

Mr. Jose Cintron
325th Civil Engineer Squadron
119 Alabama Avenue
Tyndall AFB FL 32403-5014

Re: Capital Improvements Program (CIP) in Tyndall's installation General Plan

Dear Mr. Cintron

This is to advise that the City of Panama City Utilities Department has no comments regarding the Draft Environmental Assessment for facility and infrastructure improvements, Tyndall Air Force Base, Florida dated October 2008.

Respectfully,

A handwritten signature in black ink, appearing to read "Ron Morgan", is written over the typed name.

Ron Morgan
Utilities Director

RM:ads



Seminole Nation of Oklahoma

Historic Preservation Office

Mr. Joseph V. McLernan, Chief AMF
Department of the Air Force Base
325th Civil Engineer Squadron
119 Alabama Ave.
Tyndall AFB, FL 32403-5014

10-24-08

**RE: Environmental Assessment under the National Environment Policy Act propose actions
To accommodate the development of the installation based upon the Capital Improvement
Program in General Plan in support of existing missions at Tyndall AFB.**

Dear Mr. Joseph McLernan:

At the present time, the Seminole Nation of Oklahoma would like to defer further consultation on this site to the Miccosukee Nation and the Seminole Tribe of Florida.

In the event that further discoveries are made or resources are impacted that are of significance to the Seminole Nation of Oklahoma, we would like to reserve the right to participate in future consultation.

If you have any further questions, please do not hesitate to contact my office.

Sincerely,

A handwritten signature in black ink, appearing to read "Jennifer Johnson".

Jennifer Johnson, M.Ed

Tribal Historic Preservation Officer

P.O. Box 1498

Wewoka, OK 74884

405.257.7271



Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

December 5, 2008

Mr. José J. Cintron
Department of the Air Force
325 CES/CEV
119 Alabama Avenue, Mail Stop 42
Tyndall AFB, FL 32403-5014

RE: Department of the Air Force - Scoping Notice - Draft Environmental Assessment
for Proposed Capital Improvements Program Demolition and Construction
Activities at Tyndall Air Force Base - Bay County, Florida.
SAI # FL200810234467C

Dear Mr. Cintron:

The Florida State Clearinghouse has coordinated a review of the scoping notice under the following authorities: Presidential Executive Order 12372; Section 403.061(40), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended.

The Florida Department of Environmental Protection's (DEP) Division of Waste Management notes that their review of the proposed activities focuses on issues related to the investigation and restoration of sites listed in Administrative Order 7003, issued to Tyndall Air Force Base (AFB). DEP requests additional information to determine whether the proposed work will impact the remediation of the sites listed in the Order. At a minimum, a map showing the locations of those sites should be included in the Draft Environmental Assessment (EA). This is necessary to determine whether any of the proposed projects will affect the environmental cleanup program being conducted at Tyndall AFB or, conversely, the cleanup program affect the proposed work. Any other information that can be provided to facilitate this effort should also be included in the Draft EA. Please contact Ms. Tracie Bolanos, Federal Facilities Project Manager, at (850) 245-8998 for further information and assistance with waste cleanup issues.

DEP Northwest District staff also notes that asbestos surveys will need to be conducted and notifications for renovations and/or demolition activities will need to be submitted to the DEP. Additionally, the Air Force should ensure that hazardous waste determinations, in accordance with 40 CFR 262.11, are documented for all "solid waste," as defined in 40 CFR 261.2, that will be generated as a result of construction and/or demolition activities.

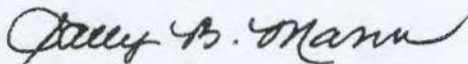
"More Protection, Less Process"
www.dep.state.fl.us

Northwest Florida Water Management District (NFWFMD) staff notes that the Consolidated Airbase Technologies Division Campus site may have potential wetland impacts. A wetlands survey is recommended and efforts to avoid and minimize construction in wetlands or their protective buffers are encouraged. Mitigation will be required for unavoidable impacts. Stormwater management practices will be important during demolition and construction activities. Alternatives to impervious parking and other paved areas are worthy of consideration to allow for groundwater recharge and runoff minimization. Low impact development practices should be employed wherever feasible. Please refer to the enclosed NFWFMD comments for additional information.

Based on the information contained in the scoping notice and the enclosed state agency comments, the state has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP). The concerns identified by our reviewing agencies must be addressed, however, prior to project implementation. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Thank you for the opportunity to review the proposal. Should you have any questions regarding this letter, please contact Ms. Lori Cox at (850) 245-2168.

Yours sincerely,



Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lec
Enclosures

cc: Darryl Boudreau, DEP, Northwest District
Tracie Bolanos, DEP, DWM
Duncan Cairns, NFWFMD



Florida

Department of Environmental Protection

"More Protection, Less Process"



Categories

[DEP Home](#) | [OIP Home](#) | [Contact DEP](#) | [Search](#) | [DEP Site Map](#)

Project Information	
Project:	FL200810234467C
Comments Due:	11/25/2008
Letter Due:	12/05/2008
Description:	DEPARTMENT OF THE AIR FORCE - SCOPING NOTICE - DRAFT ENVIRONMENTAL ASSESSMENT FOR PROPOSED CAPITAL IMPROVEMENTS PROGRAM DEMOLITION AND CONSTRUCTION ACTIVITIES AT TYNDALL AIR FORCE BASE - BAY COUNTY, FLORIDA.
Keywords:	USAF - CAPITAL IMPROVEMENTS PROGRAM DEMO & CONSTRUCTION, TYNDALL AFB - BAY CO.
CFDA #:	12.200
Agency Comments:	
WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL	
No Comments - Generally consistent with the West Florida Strategic Regional Policy Plan.	
BAY - BAY COUNTY	
STATE - FLORIDA DEPARTMENT OF STATE	
No Comments Received	
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	
The DEP's Division of Waste Management notes that their review of the proposed activities focuses on issues related to the investigation and restoration of sites listed in Administrative Order 7003, issued to Tyndall AFB. DEP requests additional information to determine whether the proposed work will impact the remediation of the sites listed in the Order. At a minimum, a map showing the locations of those sites should be included in the Draft EA. This is necessary to determine whether any of the proposed projects will affect the environmental cleanup program being conducted at Tyndall AFB. Any other information that can be provided to facilitate this effort should also be included in the Draft EA. Please contact Ms. Tracie Bolanos, Federal Facilities Project Manager, at (850) 245-8998 for further information and assistance with waste cleanup issues. DEP Northwest District staff also notes that asbestos surveys will need to be conducted and notifications for renovations and/or demolition activities will need to be submitted to the DEP. Additionally, the Air Force should ensure that hazardous waste determinations, in accordance with 40 CFR 262.11, are documented for all "solid waste," as defined in 40 CFR 261.2, that will be generated as a result of construction and/or demolition activities.	
NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT	
NWFWM staff notes that the Consolidated Airbase Technologies Division Campus site may have potential wetland impacts. A wetlands survey is recommended and efforts to avoid and minimize construction in wetlands or their protective buffers are encouraged. Mitigation will be required for unavoidable impacts. Stormwater management practices will be important during demolition and construction activities. Alternatives to impervious parking and other paved areas are worthy of consideration to allow for groundwater recharge and runoff minimization. Low impact development practices should be employed wherever feasible.	

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Visit the Clearinghouse Home Page to query other projects.

Copyright

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Project Review Form

TO: State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 47
Tallahassee, FL 32399-3000

RECEIVED

NOV 05 2008

DEP Office of
Intergov't Programs

DATE: October 31, 2008

SUBJECT: Project Review: Intergovernmental Coordination
Title: Department of the Air Force – Scoping Notice – Draft Environmental
Assessment for Proposed Capital Improvements Program
Demolition and Construction Activities at Tyndall Air Force Base –
Bay County, FL
SAI #: FL200810234467

The District has reviewed the subject application and attachments in accordance with its responsibilities and authority under the provisions of Chapter 373, Florida Statutes. As a result review, the District has the following responses:

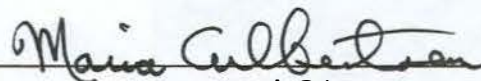
ACTION

- ☐ No Comment.
- ☐ Supports the project.
- ☐ Objects to the project; explanation attached.
- ☐ Has no objection to the project; explanation optional.
- ☐ Cannot evaluate the project; explanation attached.
- ☐ Project requires a permit from the District under ____.

DEGREE OF REVIEW

- ☒ Documentation was reviewed.
- ☐ Field investigation was performed.
- ☐ Discussed and/or contacted appropriate office about project.
- ☐ Additional documentation/research is required.
- ☒ Comments attached.

SIGNED



A-24

Duncan Jay Cairns
Chief, Bur. Env. & Res. Plng.

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

MEMORANDUM

TO: Duncan Cairns, Chief, Bureau of Environmental and Resource Planning

FROM: Leigh Brooks, Water Resource Planner

DATE: October 29, 2008

SUBJECT: Tyndall AFB NEPA Environmental Assessment

BACKGROUND

This is an environmental assessment for a proposed capital improvement program to include demolition of dozens of mostly older buildings and construction of 11 new buildings totaling over 621,000 sf.

GIS ANALYSIS

Storm Surge and Flooding

The proposed construction and demolition sites are on relatively high ground subject to inundation under a Category 5 hurricane storm surge. Sites are not in the FEMA special flood hazard area.

Groundwater

Sites are generally in the FAVA category "Vulnerable" to aquifer contamination.

Wetlands and Surface Water

All but one development site will not impact wetlands. It appears the site for Consolidated Airbase Technologies Division Campus may have potential wetland impacts.

Natural Systems and Protected Areas

Tyndall AFB is on a peninsula surrounded by St. Andrew Bay and East Bay, and encompasses the associated barrier islands.

- St. Andrew Bay is a SWIM priority waterbody
- St. Andrew Bay Aquatic Preserve is adjacent to the west
- USFWS critical habitat for Gulf sturgeon is on the Gulf of Mexico side
- USFWS critical habitat for piping plover winter habitat is on the barrier islands
- USFWS critical habitat for the Choctawhatchee and St. Andrew's beach mice is on the barrier islands and side of the peninsula facing the Gulf
- There are numerous element occurrences for listed plant and animal species on the AFB

Water Quality - Stormwater and Wastewater

Stormwater management practices will be important during demolition and construction activities.

RECOMMENDATIONS

- A wetlands survey is recommended and efforts made to avoid and minimize building in wetlands or their protective buffers are encouraged. Unavoidable impacts should be compensated through mitigation efforts.
- Redundant containment systems for hazardous material storage is encouraged.



FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lauren Milligan
Florida State Clearinghouse
3900 Commonwealth Boulevard, MS #47
Tallahassee, Florida 32399

December 11, 2008

Re: DHR No.: 2008-07011 / Received by DHR: October 29, 2008
SAI#: FL200810234467C
Demolition and Reconstruction- Multiple Buildings on Tyndall
Tyndall Air Force Base, Bay County

Dear Ms. Milligan:

Our office received reviewed the above referenced project in accordance with Section 106 of the National Historic Preservation Act as amended, the National Environmental Policy Act as amended, Chapter 267, *Florida Statutes*; Florida's Coastal Management Program; and applicable implementing federal and state regulations. The purpose of this review was to identify possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological significance to the State of Florida. The State Historic Preservation Officer is to advise and assist federal and state agencies identifying historic properties, assessing effects upon them, and considering alternatives to avoid or minimize adverse effects.

This office has the following comments:

- Since there are multiple buildings which are 50 years or older that will demolished as a result of the proposed project we request that all structures slated for demolition, that have not previously been recorded and evaluated be documented by recordation on Historic Structure form. The Florida Master Site File (FMSF) form is available online at www.flheritage.com/preservation/sitefile.
- Provide justification for the demolition of select buildings (see list at the end of the letter) which were previously determined by this office to be eligible for listing with the *National Register of Historic Places*. The information/documentation should include, but not be limited to, a brief description of the current use and condition of each building, interior and exterior photographs (digital with location key map) and any other information justifying demolition. The buildings should be referred to by the FMSF number as well.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

☐ Director's Office
(850) 245-6300 • FAX: 245-6436

☐ Archaeological Research
(850) 245-6444 • FAX: 245-6452

☒ Historic Preservation
(850) 245-6333 • FAX: 245-6437

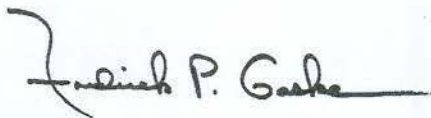
Ms. Milligan
December 11, 2008
Page 2

- Request that a professional archaeological consultant be tasked to identify archaeological sensitive areas and develop a monitoring and/or subsurface testing plan where appropriate; in addition to an unanticipated discovery contingency plan. The archaeologist should advise and include in the plans, areas of new construction that could adversely affect cultural resources. The plans should include maps of sensitive areas and of specific old and new building locations in the sensitive areas.

Provided the above conditions are met, the project will be consistent with Florida's Coastal Zone Management Program, as well as Section 106 of the National Historic Preservation Act responsibilities the Air Force must comply with.

For any questions concerning our comments, please contact Katherine Peterson, Historic Sites Specialist, by electronic mail at kdpeterson@dos.state.fl.us, or by phone at (850) 245-6333.

Sincerely,



Frederick P. Gaske, Director, and
State Historic Preservation Officer

Buildings Which Require Justification:

<u>Building No.</u>	<u>Name</u>
535	Tech Training Classroom
743	Family Support Center
1003	Post Office Center
453	CE Maintenance Shop
6014	CE Storage Shed

Xc: Joseph V. McLernan, Chief, Asset Management Flight
Wesley J. P. Westphal II, Tyndall AFB



Miccosukee Tribe of Indians of Florida

Business Council Members

Billy Cypress, Chairman

Jasper Nelson, Ass't. Chairman
Max Billie, Treasurer

Andrew Bert Sr., Secretary
William M. Osceola, Lawmaker

December 10, 2008

Mr. José Cintron
325th Civil Engineer Squadron
119 Alabama Avenue (Stop 42)
Tyndall AFB, FL 32403

Dear Mr. Cintron:

The Miccosukee Tribe of Indians of Florida received your letter concerning the Environmental Assessment to accommodate the development of the installation based upon the Capital Improvements Program in Tyndall's General Management Plan. After consultation with Mr. Fred Dayhoff and careful review of the documentation provided, the Tribe has no direct knowledge of any cultural, traditional, religious, or prehistoric resources. Therefore, the Tribe recommends that the Air Force do a Phase I Cultural Resources Survey of the areas proposed for development. We further recommend that you contact the State of Florida, Division of Historical Resources, for any information they may have concerning cultural resources. After the Phase I survey is completed and if there are any cultural resources that may be impacted as a result of the planned development, then we request that you consult with the Miccosukee Tribe.

Thank you for consulting with the Miccosukee Tribe. Please call either Fred Dayhoff (239-695-4360) or myself at the below number, Ext. 2243, if you require further information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Steve Terry", is written over a light blue horizontal line.

Steve Terry
NAGPRA & Section 106 Coordinator for
Fred Dayhoff
NAGPRA & Section 106 Representative

Notice of Availability

(no document text this page)

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PUBLIC NOTICE NOTICE OF AVAILABILITY DRAFT ENVIRONMENTAL ASSESSMENT AND PROPOSED FINDING OF NO SIGNIFICANT IMPACT FOR GENERAL PLAN-BASED ENVIRONMENTAL IMPACT ANALYSIS PROCESS

AT TYNDALL AIR FORCE BASE (AFB), FLORIDA

An Environmental Assessment (EA) has been prepared to analyze the proposed development associated with the implementation of Tyndall AFB's Capital Improvements Program. The EA, prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations, and Air Force Instructions implementing NEPA, evaluates potential impacts of the proposed and alternative actions on the environment including the No-action Alternative. Based on the EA, the Air Force has prepared a proposed Finding of No Significant Impact (FONSI).

Copies of the EA and proposed FONSI are available at Bay County Public Library, located at 898 West 11th Street Panama City, FL 32401. Phone: (850) 522-2100, and the Tyndall AFB Library, Building 916, Tyndall AFB Library, 640 Suwannee Road Tyndall AFB, Florida 32403. Phone: (850)283-4287.

Comments may be submitted through 7 July 2009 and should be provided to Mr. Jose Cinton, 325 CES/CEANC, 119 Alabama Ave., Tyndall AFB, FL 32403, (850) 283-4341.

PRIVACY ADVISORY NOTICE

Public comments on this Draft EA are requested pursuant to NEPA, 42 United States Code 4321, et seq. All written comments received during the comment period will be made available to the public and considered during the final EA preparation. Providing private address information with your comment is voluntary and such personal information will be kept confidential unless release is required by law. However, address information will be used to compile the project mailing list and failure to provide it will result in your name not being included on the mailing list.

The Associated Press

FORT LAUDERDALE

A Plantation man has been convicted of attempted murder for repeatedly hitting his ex-girlfriend in the home with a sledgehammer.

A Broward jury came back with 23-year-old Brandon Bishop's guilty verdict Friday after deliberating just 30 minutes. He could face life in prison at his July 10 sentencing.

Prosecutors say Bishop attacked 22-year-old Jennifer McClary in August 2006 when she arrived at his home for a date. He pinned her to the floor and hit her with a sledgehammer at least six times.

Doctors didn't expect McClary to survive the attack, and she suffered severe brain damage.

Bishop had pleaded not guilty by reason of insanity.

GAINESVILLE

Plaza named after Bo Diddley

Officials in Gainesville have renamed the city's downtown plaza after rock 'n' roll legend and former

STATE Briefs

Florida resident Bo Diddley.

Diddley died in June 2008. Officials honored him Friday by unveiling a mural and renaming the downtown space the Bo Diddley Community Plaza. Diddley lived in Archer, a few miles southwest of Gainesville, and played at the plaza in 2006.

At a ceremony, Diddley's grandson Garry Mitchell thanked the city, and he and other family members gave city officials one of Diddley's guitars. "Gainesville's been really good to my granddad," Mitchell said. "Thank you for your encouragement and your prayers. Long live rock and roll!"

Diddley's family plans to unveil his tombstone in Bronson, also southwest of Gainesville, at 10 a.m. today.

DAYTONA BEACH

Man jumps on police car

Authorities say a Daytona Beach man facing a sex charge jumped on



BO DIDDLEY

a patrol car when officers tried to arrest him.

Police say officers went to arrest 25-year-old Chris Andre Hicks on Friday morning after DNA tests showed he was the father of a 15-year girl's baby. When officers told him he was under arrest on a charge of lewd or lascivious battery, police say he ran away and jumped on the patrol car. Officers say he broke the windshield and caused minor damage to the left side of the vehicle.

ORLANDO

2 die when vehicle overturns

Authorities say two people died when the vehicle they were riding in overturned on Interstate 4 in Orange County.

The Florida Highway Patrol said 25-year-old Roberto Valles was driving on I-4 Thursday night when his vehicle ran off the roadway and onto the grass. The car hit an exit sign and flipped onto its roof.

Two passengers were ejected and later died. Valles and another passenger were taken to a hospital in serious condition.

BAY POLICE Beat

Information is provided by the Bay County Sheriff's Office on people arrested on felony charges through 8 a.m. Thursday, June 4. Those arrested can contact The News Herald if charges are dropped or if they are acquitted. Addresses are those given by the defendant during the arrest.

Richard Dewayne Finch, 39, 3120 Minnesota Ave., Panama City, burglary, assault, Bay County Sheriff's Office.

Philip E. Strickland, 46, Albany, Ga., violation of probation (aggravated battery), BCSO.

Michael Anthony Dixon, 46, 2540 S. Cedar Lane., Panama City, violation of probation (grand theft), BCSO.

Linda Diane Turner, 42, 128 N. Charlene Ave., Panama City, violation of probation (possession of a controlled substance), BCSO.

Charles Dewayne Roberts, 38, violation of probation (possession of meth), BCSO.

Megan Machelie Byrd, 19, 201 E. 25th St., Lynn Haven, violation of probation

(grant theft, fraud, burglary) BCSO.

Christopher Antonio Owens, 39, 1220 Stephen Drive, Panama City, evading sales tax, larceny of sales, BCSO.

Albert Atkinson, 53, 518 Everitt Ave., Panama City, felony battery, BCSO.

Lamarious Demond Washington, 29, 1121 Bay Ave., Panama City, violation of probation (obstructing a criminal investigation), BCSO.

Lacandor Dejuan Atkinson, 32, 512 Bob Little Road, Panama City, violation of probation (felony battery), BCSO.

John William Knotts, 21, 150 Sims Ave., Callaway, fraud, dealing in stolen property, burglary, larceny, BCSO.

Ted L. Cobbs, 46, 1126 Bozy Drive, Southport, principal/accessory to burglary, BCSO.

Christy Lynn Tanner, 23, 1402 Joe Lewis Drive, Panama City, selling drugs, petit larceny, dealing in stolen property, PCPD.

Sandra Lajuan McKay, 43, 6422 Buford King Lane, Youngstown, grand theft auto, PCPD.

Lat. Michael, 30, 500

suspended or revoked), BCSO.

Grady Lynn Cross, 38, 321 Summerwood Drive, Panama City Beach, violation of probation (aggravated stalking, battery), BCSO.

Christopher Jermaine Spann, 24, Miami, violation of probation (battery on a correctional officer), BCSO.

Rene Joseph Diaz, 42, 1514 Orange Hill Road, Chipley, violation of probation (trafficking in stolen property, grand theft, forgery), BCSO.

Louis Manuel Javier, 45, 6330 Pridgen St., Panama City, larceny, dealing in stolen property, BCSO.

Aonray Terrail Wade, 23, 2121 Harrison Ave., Panama City, violation of probation (felony battery), BCSO.

Robert Guinn Howard, 44, transient, violation of probation (arson, robbery), PCPD.

Marc Addison Logan, 37, 1122 Bay Ave., Panama City, kidnapping, PCPD.

Willie Wesley Pannynwell, 35, 734 Redwood Ave., Panama City, sale of cocaine, kidnapping, trafficking in cocaine, violation of probation

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Draft EA Letter Example

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Joseph V. McLernan
325th Civil Engineer Squadron
119 Alabama Ave
Tyndall AFB, FL 32403-5014

Mr. Lester Wiggins
Creek Capital Complex
P.O. Box 580
Okmulgee, OK 74447

Dear Mr. Wiggins,

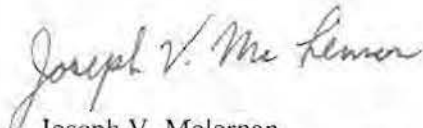
The draft Environmental Assessment (EA) for the General Plan-Based Environmental Impact Analysis Process at Tyndall Air Force Base (AFB), Florida will be released for public comment on 7 June, 2009. The Air Force is proposing to implement the Capital Improvements Program (CIP) associated with Tyndall AFB's General Plan. The purpose of the proposed and alternative actions is to construct and/or modify facilities and infrastructure at Tyndall AFB (1) as a part of the overall CIP, or (2) as needed to support future mission growth and development on the installation. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace or renovate old inadequate facilities; correct current deficiencies; and accommodate potential new mission activities, personnel, and equipment.

The draft EA describes and analyzes alternative plans for installation development, including the No-action Alternative, under which installation development would not occur. Copies of the draft EA are maintained at the Bay County Public Library, located at 898 West 11th Street Panama City, FL 32401, Phone: (850) 522-2100, and the Tyndall AFB Library, Building 916, Tyndall AFB Library, 640 Suwannee Road Tyndall AFB, Florida 32403, Phone: (850)283-4287.

We request your participation in the process, and solicit any comments or concerns you may have on the draft EA. Comments may be submitted through 7 July, 2009 and should be provided to Mr. Jose J. Cintron at the following address:

325 CES/CEANC
119 Alabama Avenue (Stop 42)
Tyndall AFB, FL 32403-5014

Sincerely,


Joseph V. McLernan
Chief, Asset Management Flight

Attachment:
Draft Environmental Assessment

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Draft EA Responses

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*"Dedicated to Excellence . . .
People Serving People"*

June 12, 2009

Mr. Joseph V. McLernan
325th Civil Engineer Squadron
119 Alabama Avenue (Stop 42)
Tyndall AFB FL 32403-5014

Re: Capital Improvements Program (CIP) in Tyndall's installation General Plan

Dear Mr. McLernan

This is to advise that the City of Panama City Utilities Department has no comments regarding the Draft Environmental Assessment for facility and infrastructure improvements, Tyndall Air Force Base, Florida dated April 2009.

Respectfully,

Ron Morgan
Utilities Director

RM:ads



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Field Office
1601 Balboa Avenue
Panama City, FL 32405-3721

Tel: (850) 769-0552

Fax: (850) 763-2177

July 6, 2009

Mr. Jose J. Cintron
Department of the Air Force
325 CES/CEANC
119 Alabama Avenue (Stop 42)
Tyndall AFB, Florida 32403-5014

Re: FWS No: 2009-FR-0154
Department of the Air Force - Draft
EA for Tyndall AFB General Plan-
Based Environmental Impact
Analysis Process
Bay County, Florida

Dear Mr. Cintron:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) receipt of your June 08, 2009, Department of the Air Force - Draft Environmental Assessment (EA) for Tyndall Air Force Base (AFB) General Plan-Based Environmental Impact Analysis (Volume I and II). The Air Force proposes to implement future installation development based upon the Capital Improvement Plan (CIP) contained within the current *Tyndall AFB General Plan* (General Plan). The proposed action will construct approximately 936,525 square feet of new facilities and demolish approximately 545,627 square feet of existing facilities and infrastructure at Tyndall AFB. There will not be any new missions, new aircraft, or personnel assigned to Tyndall AFB as a result of the proposed action. Projects that would be built concurrently with the alternatives analysis in the EA would also create additional 3.4 acres of impervious cover on Tyndall AFB. Tyndall AFB is located at approximate latitude 30° 03' 58.16" N and longitude -85° 34' 57.52" W. The following comments are provided in accordance with the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e), and section 7 of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531-1543).

The following issues need to be addressed in the Draft EA for Tyndall AFB General Plan-Based Environmental Impact Analysis:

1. Page 3-37. The Service does not designate Critical Wildlife Areas. Our agency and the National Marine Fisheries Service designate critical habitat for federally protected

species in accordance with section 4 of the ESA of 1973, as amended. Species occurring on Tyndall AFB that have federally designated critical habitat include the Gulf sturgeon, non-breeding piping plover, Choctawhatchee beach mouse (*Peromyscus polionotus allopshys*), and St. Andrew beach mouse (*Peromyscus polionotus peninsularis*).

The Florida Fish and Wildlife Conservation Commission is the agency responsible for designating Critical Wildlife Areas. For more information visit the following web site: http://myfwc.com/CONSERVATION/Conserv_Progs_Spp_Conserv_criticalwildlifeareas.htm.

2. Page 3-38. Table 3-10.
For the St. Andrew beach mouse a "CH" should be added to the table. Critical habitat was designated for the beach mouse in 2006.
3. Page 4-22. Exterior lighting on new construction could have an adverse impact on nesting and hatchling sea turtles or the Choctawhatchee and St. Andrew beach mice if any of the lighting illuminates, contributes to cumulative sky glow, or is visible from the beach and dune habitats on Shell Island, or East and West Crooked Islands. All lighting should be fully shielded or equipped with a full-cut off fixture; if the fixture is visible from the beach or dunes, lamps that use low pressure sodium or amber or red LED should be used.
4. Historic occurrences for the listed plant species Violet-flowered Butterwort (*Pinguicula ionantha*) has been documented in the vicinity of the Consolidated Airbase Technologies Division Campus. In addition, several historical occurrences for species at risk have been documented in that area of the Tyndall AFB. Species at risk are plant and/or animal species that are not yet federally listed as threatened or endangered under the ESA, but that are either designated as candidates for listing or are regarded as critically imperiled or imperiled throughout their range. While not currently protected under the ESA, conserving species at risk now may prevent the need to list them in the future. A habitat assessment will be necessary to document potential project effects on these plants. Where appropriate habitat is present, we recommend surveying for the threatened Violet-flowered Butterwort (*Pinguicula ionantha*), and the following species at risk: Larged-leaved Jointweed (*Polygonella macrophylla*), Gulf Coast Lupine (*Lupinus westianus*), Quillwort Yellow-eyed Grass (*Xyris isoetifolia*), Karst Pond Yellow-eyed Grass (*Xyris longisepala*), Giant Water Dropwort (*Oxypolis greenmanii*), and Thick-leaved Water Willow (*Justica crassifolia*) and avoiding potential project effects on these plants.
5. Least terns, black skimmers, and the occasional gull-billed tern, all protected by the Migratory Bird Treat Act (MBTA), are known to nest on gravel rooftops. Gravel rooftop buildings slated for demolition, need a survey conducted for nesting birds if destruction occurs between 1 April and 1 September on any given year. If nesting birds are located on the rooftops, demolition will need to be postponed until the birds have completed nesting for that season. Under the provisions of the MBTA it is unlawful "by any means

or manner to pursue, hunt, take, capture or kill any migratory bird except as permitted by regulations issued by the Fish and Wildlife Service. The term "take" is not defined in the MBTA, but the Service has defined it by regulation to mean to pursue, hunt, shoot, wound, kill, trap, capture or collect any migratory bird, or any part or egg of any migratory bird covered by the conventions or to attempt those activities.

6. Tyndall AFB has considerable areas of high quality habitat representative of Florida. The Service believes that there is the (albeit remote) potential of affecting the federally listed Eastern indigo snake (*Drymarchon couperi*). The service recommends that construction personnel, contractors, and subcontractors be cautioned to refrain from killing or harassing snakes and to immediately report any sighting of indigo snakes. Placards with photographs of indigos should be distributed to construction crews to reduce the potential for mis-identification and/or killing of indigo snakes that may be encountered. Indigos are known to use the burrows of gopher tortoises, particularly during times of extreme heat. The service requires that all tortoise burrows be "scoped" for the presence of indigos, if the burrow is to be destroyed by construction activities.

Gopher Tortoises are state protected species and are considered a federal species at risk. We require surveys for burrows and burrow protection when possible. We also recommend that Tyndall AFB Natural Research Branch contact the Florida Fish and Wildlife Conservation Commission, if any gopher tortoise burrows are located on any of the proposed project sites. Conserving these species now may prevent the need for federal protection in the future.

Thank you for the opportunity to comment on your Draft EA for Tyndall AFB General Plan-Based Environmental Impact Analysis. If you have any questions or need additional information, please contact Mr. Ted Martin at 850-769-0552 (ext. 239). Please refer to the reference number located at the top of this letter in future phone calls or written correspondence.

Sincerely,



Santiago Gonzales
Acting Field Supervisor



Miccosukee Tribe of Indians of Florida

Business Council Members

Billy Cypress, Chairman

Jasper Nelson, Ass't. Chairman
Max Billie, Treasurer

Andrew Bert Sr., Secretary
William M. Osceola, Lawmaker

July 7, 2009

Mr. Jose Cintron
325 CES/CEANC
119 Alabama Avenue (Stop 42)
Tyndall AFB, FL 32403-5014

RE: Draft EA for the General Plan-Based Environmental Impact Analysis Process at Tyndall AFB

Dear Mr. Cintron:

The Miccosukee Tribe of Indians of Florida received a copy of the Draft EA mentioned above. After careful review of the documentation provided and in consultation with Mr. Dayhoff, the Tribe has no objections to this EA. We simply request that if any archaeological sites are found during the implementation phase of the Capital Improvements Plan that we be notified so we may offer our comments.

Thank you for consulting with the Tribe. Please contact me at the below number, Ext. 2243, or Mr. Dayhoff at (239) 695-4360, if you require additional information.

Sincerely,

Steve Terry
NAGPRA & Section 106 Coordinator for
Fred Dayhoff
NAGPRA & Section 106 Representative



FLORIDA DEPARTMENT OF STATE

Kurt S. Browning

Secretary of State

DIVISION OF HISTORICAL RESOURCES

Mr. Jose J. Cintron
Department of the Air Force
325 CES/CEANC
119 Alabama Avenue (Stop 42)
Tyndall Air Force Base, Florida 32403-5014

July 21, 2009

RE: DHR Project File Number: 2009-3371

Draft Environmental Assessment for the General Plan-Based Environmental Impact Analysis Process
Tyndall Air Force Base, Bay County

Dear Mr. Cintron:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, *36 CFR Part 800: Protection of Historic Properties* and the *National Environmental Policy Act of 1969*, as amended.

For archaeological resources, it is the opinion of this office that ground disturbing activities in undisturbed areas should be subjected to a cultural resources assessment survey. For ground disturbing activities in previously disturbed areas, the Department of the Air Force will need to make contingency plans in the case of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area.

For historic resources, we note that 64 buildings are proposed for demolition. Coordination with this office on the *National Register* eligibility of all the building or structures should proceed as soon as possible.

General comments:

- Page 2, line 34 – change “archaeologist” to “cultural resource professional”
- Page 4-25, line 16 – change “archaeologist” to “cultural resource professional”
- Page 4-26, line 8 – change “archaeologist” to “cultural resource professional”

We look forward to working with you on a successful project. If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail sedwards@dos.state.fl.us, or at 850-245-6333 or 800-847-7278.

Sincerely,

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

☐ Director's Office
(850) 245-6300 • FAX: 245-6436

☐ Archaeological Research
(850) 245-6444 • FAX: 245-6452

☒ Historic Preservation
(850) 245-6333 • FAX: 245-6437

Project Information	
Project:	FL200906124793C
Comments Due:	07/20/2009
Letter Due:	08/07/2009
Description:	DEPARTMENT OF THE AIR FORCE - DRAFT ENVIRONMENTAL ASSESSMENT FOR GENERAL PLAN-BASED INSTALLATION DEVELOPMENT, CAPITAL IMPROVEMENTS PROGRAM AT TYNDALL AIR FORCE BASE - BAY COUNTY, FLORIDA.
Keywords:	USAF - DEA INSTALLATION DEV. CAPITAL IMPROVEMENTS PROGRAM, TYNDALL AFB - BAY CO.
CFDA #:	12.200
Agency Comments:	
WEST FLORIDA RPC - WEST FLORIDA REGIONAL PLANNING COUNCIL	
The WFRPC recommends the following to protect area surface and groundwater resources: - Proposed development activities should be conducted in a manner that does not structurally impair, reduce the flow, or increase sediment loading of any on-site or adjacent waterbodies. - Construction buffers should be maintained at all times and may include staked hay bales, staked filter cloth, and planting of native species. - Landscaping should consist of native species suited to that particular area. - Avoid the use of fertilizers, pesticides, and herbicides. - Preserve native species on-site during construction to minimize the need to replant once construction is completed. - Use reclaimed water and/or rainwater for irrigation purposes as well as for bathroom facilities. - Create pervious surfaces as opposed to impervious surfaces.	
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS	
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION	
NO COMMENT BY TED HOEHN ON 7/10/09.	
STATE - FLORIDA DEPARTMENT OF STATE	
The DOS indicates that ground disturbing activities in undisturbed areas should be subjected to a cultural resources assessment survey. In previously disturbed areas, the Air Force will need to make contingency plans in the case of fortuitous finds or unexpected discoveries within the project area. Staff notes that 64 buildings are proposed for demolition - coordination with the DOS on "National Register of Historic Places" eligibility should proceed as soon as possible.	
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION	
The FDOT Aviation Office has no comments.	
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	
The DEP Northwest District Office in Pensacola advises that the proposed construction projects will require an Environmental Resource Permit (ERP) for stormwater management and wetland resource protection under Chapter 62-346, F.A.C. House Bill 7163 called for the creation and implementation of the ERP program for the geographic area of the NFWFMD. It did so with the requirement that the program be implemented in two phases. Phase I, stormwater ERP, was implemented on October 1, 2007. Phase II, wetland resource ERP, is tentatively scheduled for implementation in early 2010 - at which point both permits will be consolidated. For more information on the Chapter 62-346, F.A.C., permitting requirements, please contact Mr. Lee Marchman, NFWFMD, at (850) 921-2986 or Mr. Cliff Street, DEP, at (850) 595-8300, ext. 1135. Additionally, DEP notes that the State of Florida has recommended that Bay County be designated as Non-Attainment for Ozone by the Environmental Protection Agency. A formal designation is anticipated for March 2010. The DEP advises that this reclassification may impact project analysis in the future. Finally, DEP staff notes that the project will require permitting for both potable water and domestic wastewater line extensions/connections. If the connection size exceeds 12 inches, permitting will fall under the authority of the DEP. Connections less than 12 inches will require permitting from the local Department of Health office. Please contact Mr. John Pope at (850) 595-8300, ext. 1145 regarding potable water permitting questions and Mr. Bill Evans at ext. 1153 regarding domestic wastewater permitting.	
NORTHWEST FLORIDA WMD - NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT	
The NFWFMD recommends that best management practices be utilized during construction to prevent soil erosion and sedimentation. Innovative low impact development (LID) approaches to design and stormwater management, such as using concrete grass pavers instead of solid concrete and use of Florida-Friendly landscaping, are also recommended to reduce irrigation needs, impervious surfaces, stormwater runoff, and non-point source pollution of water resources and to increase groundwater recharge. Staff suggests that an evaluation of the potential for storm surge inundation of the industrial sewage lagoon be conducted and a contingency plan be established to prevent surface water contamination and health risks.	

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Appendix B

Capability Analysis

General Plan-Based Environmental Impact Analysis Process Capability Analysis



Tyndall Air Force Base



**United States Air Force
Air Education and Training Command
325th Flying Training Wing/
Tyndall Air Force Base, Florida**

November 2008

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APPENDIX

Appendix A – Land Use Calculations

ACRONYMS AND ABBREVIATIONS

AETC	Air Education and Training Command
AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
ANG	Air National Guard
AT/FP	antiterrorism/force protection
AWTTP	Advanced Waste Water Treatment Plant
Bdrm	bedroom
dB	decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
FIX	Facility Infrastructure Examination
FY	fiscal year
hr	hour
IFR	Instrument Flight Rules
MCF	thousand cubic feet
MFH	Military Family Housing
MGD	million gallons per day
MOA	Military Operation Area
MW	megawatts
MW-hr	megawatt-hours
NAAQS	National Ambient Air Quality Standards
NOx	nitrogen oxides
PANCAP	Practical Annual Capacity
PAR	precision approach radar
PHOCAP	Practical Hourly Capacity
%	percent
QD	quantity distance
SF	square feet
SUA	special use area
tpy	tons per year
UFC	United Facilities Criteria
VFR	Visual Flight Rules
WEG	Weapons Evaluation Group
WSEP	Weapons System Evaluation Program

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CHAPTER 1

EXECUTIVE SUMMARY

The primary objective of this Capability Analysis is to determine the capacity for sustainable growth and development and the assumptions and rationale used to determine the capability with respect to flying and non-flying mission elements at Tyndall Air Force Base (AFB), Florida. The development potential presented in this report will be used to establish a potential development alternative to be assessed in the upcoming Installation Development Environmental Assessment.

For the non-flying mission, three primary resource areas were analyzed to quantify capacity to accommodate future growth and development: land use/development, population/housing, and utility systems. In addition, other resource areas such as air emissions, solid waste, storm water collection, and socioeconomic resources were analyzed to determine if they could be limiting factors for growth and development. The non-flying mission capability analysis is summarized below:

- Tyndall AFB consists of 28,460 acres of land, of which approximately 9,045 acres are considered developed. Tyndall AFB land development headspace is considered to be 6,874.4 acres of developable, unconstrained land or approximately 24 percent of total land area.
- Tyndall AFB currently has 2,398 military personnel and dependents residing on base and has the capacity to house 3,372 personnel and dependents. This equates to an actual occupancy rate of 71 percent. The reported Tyndall AFB occupancy rate is 92 percent (Barbieri 2008). In order to accommodate the Tyndall AFB mission, a certain number of dormitory units must be held available at any given time to house immediately incoming personnel. Therefore, the current reported housing occupancy rate of 92 percent is greater than the actual occupancy rate. Considering conceptual future housing capacity associated with land development, as well as planned construction, demolition, and renovation activities associated with Military Family Housing (MFH) privatization, Tyndall AFB has the future capacity to accommodate 4,803 on-base military personnel and dependents.
- Tyndall AFB utility systems operate at a fraction of their capacities. The limiting utility system is the electrical system. Tyndall AFB is capable of accommodating up to a doubling of electricity demand, whereas other systems would allow for an increase of up to nine times the current rate of usage. Improvement and expansions to some on-base distribution or treatment systems could be required to accommodate such increases; however, excess capacity exists with respect to the resource (water, electricity, etc.).
- The projected population growth rate for Tyndall AFB, under future installation development, is 6.8 percent. The projected population growth would not represent a limiting factor for growth on the installation. Sufficient acreage is available on the

installation for additional housing construction to support an increase in population. Additionally, it is important to note that local socioeconomic resources could expand to accommodate the development scenario if the development scenario were viewed as a positive impact to the local community.

For the flying mission, aircraft noise, airfield capacity, and airspace utilization were analyzed to quantify the capacity to accommodate future growth and development at the installation. The flying mission capability analysis is summarized by the following:

- As of 2007, approximately 114,000 annual aviation operations occur at Tyndall AFB. Using a limiting factor based on a 2 decibel noise level increase at sensitive receptors, Tyndall AFB would be capable of supporting 182,897 annual operations. This represents a capacity to increase all flying operations by 60 percent.
- Based on the Practical Hourly Capacity metric for determining airfield throughput, the theoretical maximum capacity of the Tyndall AFB airfield is 449,280 annual operations. This represents a capacity to increase flying operations by 294 percent.
- With respect to capacity to accommodate future aircraft operations, noise exposure limitations represent the most limiting constraint. Based on current utilization rates, Tyndall AFB airspace would require a test and training space needs statement to determine whether designation of additional special use airspace would be warranted.

CHAPTER 2

NON FLYING MISSION CAPABILITY

2.1 LAND-USE ANALYSIS

2.1.1 Methodology and Background

This section analyzes the capability of Tyndall AFB facilities and infrastructure to expand into undeveloped areas of the installation. This section utilizes the same methodology as contained in the 2008 *Tyndall AFB Natural Infrastructure Assessment* for determining developable land on the installation considering various land-use compatibility and environmental constraints (USAF 2008a). The current land-use plan in the Tyndall AFB 2004 *General Plan* served as the baseline for determining the distribution of land-use categories and characterizing the intensity of existing development on the installation. The information from the baseline analysis was then “projected” onto developable land providing a snapshot of the growth potential of the installation. It was assumed that no additional land acquisition would occur; therefore, maximum development was limited by land available within the existing installation boundaries.

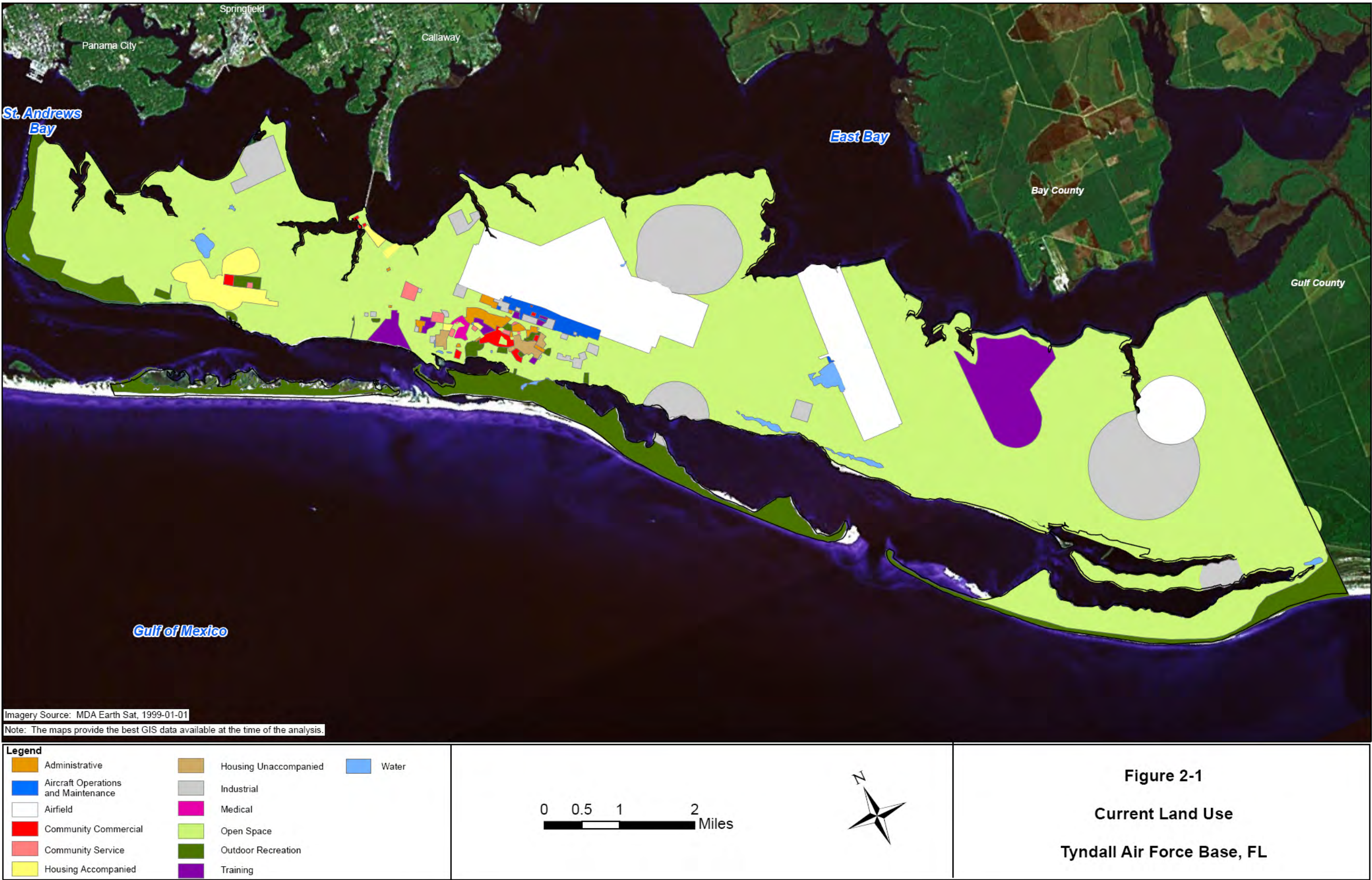
2.1.2 Analysis of Existing Land Use

The current land-use plan is shown in Table 2-1. The current land-use map for Tyndall AFB is shown in Figure 2-1.

Table 2-1 Tyndall AFB 2004 Current Land-use Plan

Land-use Category	Area (Acres)	Percent of Total Land
Administrative	111.7	0.4
Airfield	2,529.6	8.9
Aircraft Operations and Maintenance	152.5	0.5
Community Commercial	78.6	0.3
Community Service	55.8	0.2
Housing Accompanied	404.0	1.4
Housing Unaccompanied	73.0	0.3
Industrial	2,533.3	8.9
Medical	26.5	0.1
Open Space	19,414.7	68.2
Outdoor Recreation	2,176.5	7.6
Training	904.0	3.2
Total	28,460.1	100
Source: (USAF 2004a) Notes: -Water land use, as shown on the <i>General Plan</i> map, was included in <i>Open Space</i> land use. -Airfield Pavement land use, as shown on the <i>General Plan</i> map, was included in <i>Airfield</i> land use.		

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Based upon Table 2-1 and Figure 2-1, approximately 68 percent of Tyndall AFB is classified as *Open Space* representing significant potential for land development. Additional analysis is shown in Table 2-2 that characterizes existing development on Tyndall AFB.

Table 2-2 Existing Development Metrics

Land-use Category	Developed Area ⁽¹⁾ (Acres)	Existing Impervious Cover ⁽²⁾ (Acres)	Existing Facility Space ⁽³⁾ (SF)
Administrative	111.7	39.4	470,206
Airfield	2,529.7	358.2	21,274
Aircraft Operations and Maintenance	152.5	94.3	278,329
Community Commercial	78.6	36.5	177,032
Community Service	55.8	15.1	244,874
Housing Accompanied	404.0	112.3	98,878
Housing Unaccompanied	73.0	29.7	441,329
Industrial	2,533.3	123.3	672,865
Medical	26.5	12.0	40,665
Outdoor Recreation	2,176.5	29.3	74,606
Training	904.0	58.3	155,962
Total	9,045.6	908.4	2,676,020
Notes: (1) All land uses other than <i>Open Space</i> are considered developed land uses. (2) Existing Impervious Cover calculated via facility and infrastructure footprint as shown on existing land-use map (Figure 2-1). (3) Existing Facility Space calculated via Air Force Form 7115 Real Property Data (USAF 2007a). SF – square feet			

2.1.3 Determination of Developable Land

The methodology for determining developable land on Tyndall AFB was based upon the 2008 *Tyndall AFB Natural Infrastructure Assessment* (USAF 2008a), and involves a comparative analysis of undeveloped areas on Tyndall AFB with various development constraints. For the purposes of this analysis, it is helpful to define the following terms.

Developed Land: All existing land area that is classified as any land use other than *Open Space* is considered to be Developed Land. Per Table 2-2, Tyndall AFB has approximately 9,046 acres of Developed Land. The *Tyndall AFB Natural Infrastructure Assessment* further classifies land areas with known land-use compatibility constraints, such as Safety Quantity-Distances (QD) and Airfield Clear Zones, as developed. For the purposes of this analysis, areas with these restrictions are included in the development constraints analysis below as opposed to the Developed Land area.

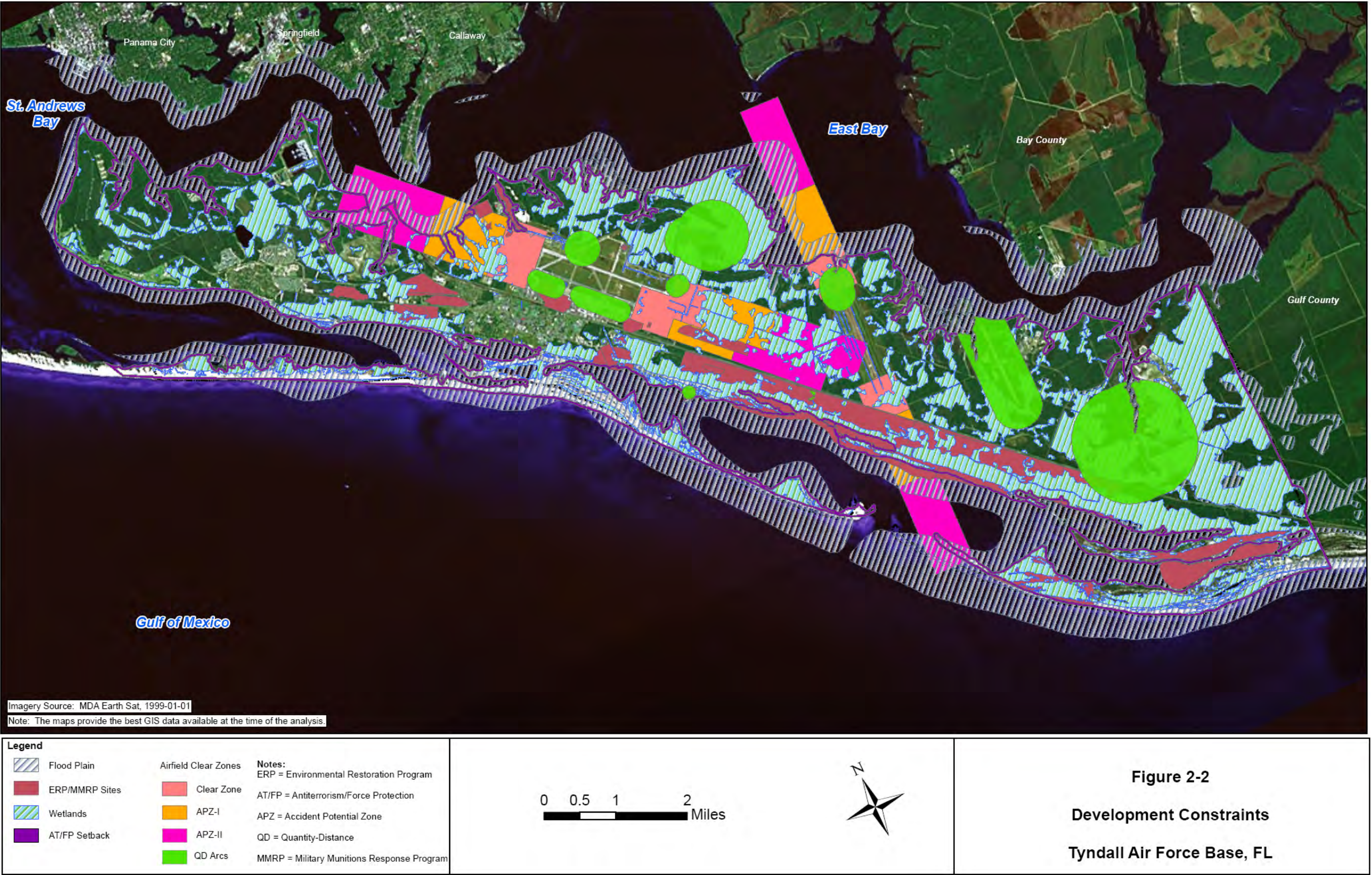
Undeveloped Land: All land area that is classified as *Open Space* is considered Undeveloped Land. Per Table 2-1, Tyndall AFB has approximately 19,415 acres of Undeveloped Land.

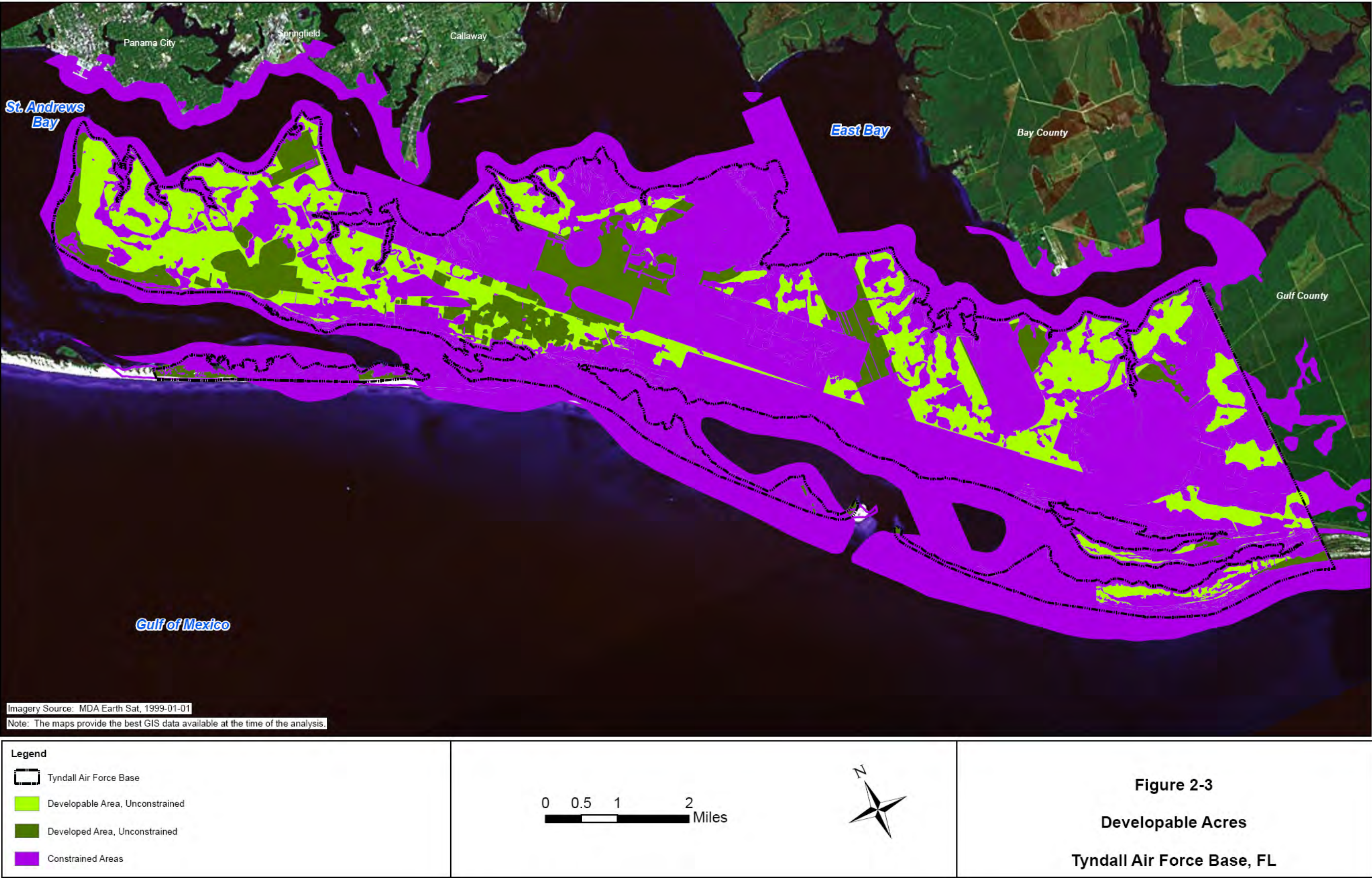
Constrained Land: Seven possible constraints to land development were considered as a part of this analysis. These constraints can be divided into two general categories: land-use compatibility and environmental. Land-use compatibility constraints include: Safety QD Arcs, Small Arms Range Safety Zones/Military Munitions Response Program sites (displayed with ERP sites on Figure 2-2), Air Installation Compatible Use Zones (AICUZ) (Airfield Clear Zones and Accident Potential Zones I and II), and a 150-foot antiterrorism/force protection (AT/FP) buffer zone along the installation perimeter. Environmental constraints include areas designated as wetlands, within the 100-year floodplain and Environmental Restoration Program (ERP) Sites. Constrained areas on developed land total approximately 6,120 acres and constrained areas on undeveloped land total approximately 12,540 acres. A map of the development constraints on Tyndall AFB is found in Figure 2-2.

Developable Land: Per the *Natural Infrastructure Assessment*, Tyndall AFB *Developable Land* is defined as undeveloped land that is not subject to the development constraints previously discussed. While the various development constraints present on Tyndall AFB do not preclude all types of development on constrained land, the abundance of unconstrained open space allows the land development model for Tyndall AFB to focus on unconstrained open space. Table 2-3 presents the results of the overall *Developable Land* analysis for Tyndall AFB. *Developable Land* is also shown on an installation map in Figure 2-3.

Table 2-3 Developable Land on Tyndall AFB

Land Category	Acres
Total Installation Land ⁽¹⁾	28,460.1
Developed Land ⁽²⁾	9,045.6
Undeveloped Land ⁽³⁾	19,414.7
Undeveloped Land with Constraints ⁽⁴⁾	12,540.3
Developable Land	6,874.4
Notes: (1) From Table 2-1. (2) From Table 2-2. (3) Reflects existing <i>Open Space</i> From Table 2-1. (4) Calculated from Geographic Information Services data.	





2.1.4 Future Land Development

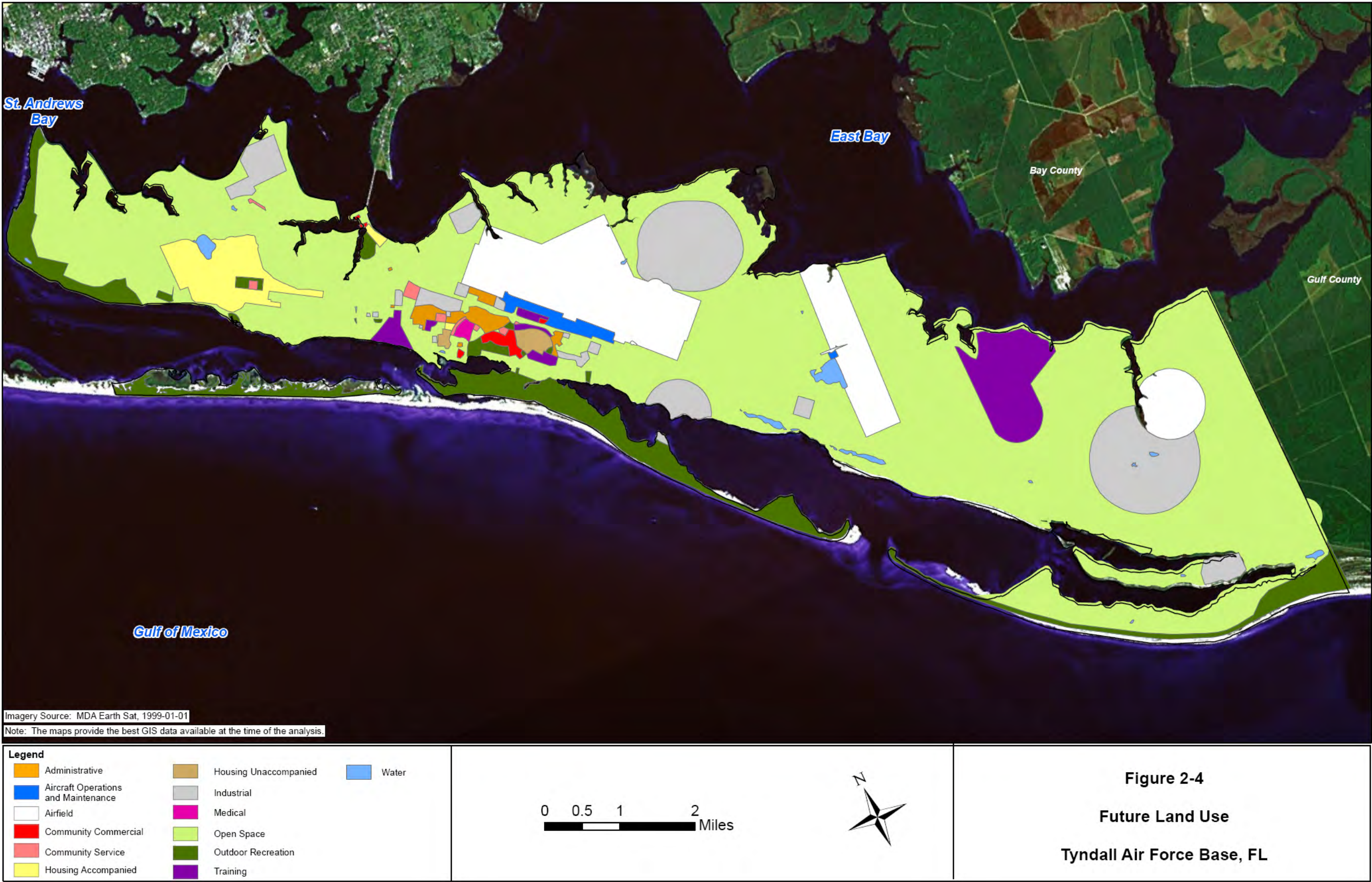
The *General Plan* calls for redistribution of 732.1 developable acres of open space to other land-use categories. The majority of redistribution occurs as a large expansion of the *Airfield* and *Housing Accompanied* land uses. A slight decrease in acreage is planned for *Community Commercial* land use. Figure 2-4 shows the future land-use map for Tyndall AFB. Additionally, to consider the maximum amount of future development possible, the remaining 6,142.2 acres of developable open space at Tyndall AFB were distributed across all developed land use in a manner consistent with the existing allocation. Table 2-4 shows the future land-use distribution for Tyndall AFB based upon the existing allotment and land-use changes described in the *General Plan*.

Table 2-4 Future Land-use Distribution

Land-use Category	Current Land-use Area (Acres)	Land-use Area Added/(Subtracted) (Acres)	Future Land-use Area (Acres)
Administrative	111.7	161.7	273.4
Airfield	2,529.6	1,854.6	4,384.3
Aircraft Operations and Maintenance	152.5	128.3	280.7
Community Commercial	78.6	49.1	127.8
Community Service	55.8	45.8	101.6
Housing Accompanied	404.0	564.8	968.8
Housing Unaccompanied	73.0	79.5	152.5
Industrial	2,533.3	1,799.4	4,332.7
Medical	26.5	22.6	49.0
Open Space	19,414.7	-6,874.4	12,540.3
Outdoor Recreation	2,176.5	1,501.4	3,677.9
Training	904.0	667.2	1,571.1
Total	28,460.1	0.00	28,460.1
Source: (USAF 2004a)			
Notes:			
(1) Water land use, as shown on the <i>General Plan</i> maps, was included in <i>Open Space</i> land use.			
(2) Airfield Pavements and Airfield land uses, as shown on <i>General Plan</i> maps, were combined into a single Airfield land use.			

Table 2-4 reflects development of approximately 6,874 acres of *Open Space* (as shown in Table 2-3) available on the installation. This includes development of 100 percent of the developable *Open Space* acreage while considering development planned in the *General Plan*. A 2030 *Plan* outlined in the *General Plan* provides a description of the proposed changes in land use at Tyndall AFB. Future development of Tyndall AFB proposed in the *General Plan* includes actions such as:

- a) Further development of the flightline to support transitions in fighter pilot training.
- b) Development of the Community Center to be a pedestrian friendly place for active military personnel, their families, and retired military personnel to safely shop and enjoy many of the recreation amenities available to them on Tyndall AFB. Also, Community Center facilities must be consolidated to make them more economical to operate and maintain.
- c) Development of an existing area east of the Community Center into a dormitory campus for permanent party enlisted personnel.
- d) Development of a professional military education campus to support additional new programs including an expansion of the Air Force Reserve Officer Training Corps summer program.
- e) Additional development of the Air Battle Manager Training Center to support training of air battle managers and members of allied military forces.
- f) Transportation improvements to link currently separated sides of Tyndall AFB and to support new facilities.
- g) Relocation of the 325th Civil Engineering Squadron.



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Table 2-5 summarizes the development factors used to project further land development beyond the *General Plan* at Tyndall AFB.

Table 2-5 Installation Factors for New Development

Land-use Category	Distribution of Future Land Use ⁽¹⁾	Impervious Cover Density Factor ⁽²⁾	Facility Space Density Factor ⁽³⁾
Administrative	1.2%	35.3%	9.7%
Airfield	28.0%	14.2%	0.0%
Aircraft Operations and Maintenance	1.7%	61.8%	4.2%
Community Commercial	0.9%	46.4%	5.2%
Community Service	0.6%	27.1%	10.1%
Housing Accompanied	4.5%	27.8%	0.6%
Housing Unaccompanied	0.8%	40.7%	13.9%
Industrial	28.0%	4.9%	0.6%
Medical	0.3%	45.3%	3.5%
Open Space			
Outdoor Recreation	24.0%	10.0%	0.1%
Training	1.0%	6.5%	0.4%
Notes: (1) Based on distribution of developed land uses in current land-use plan, as found in Table 2-1. (2) Impervious Cover Density Factor equals existing impervious cover area in each land-use category (acres) divided by the area of each land-use category (acres), as found in Table 2-2. (3) Facility Space Density Factor equals existing facility space in each land-use category (acres) divided by the area of each land-use category (acres), as found in Table 2-2.			

Using the Impervious Cover and Facility Space Density Factors shown in Table 2-5, the projected additional impervious cover and facility space for the development model is shown in Table 2-6.

Table 2-6 Project Impervious Cover and Facility Space for Maximum Development

Area of New Land Development⁽¹⁾ (Acres)	Additional Impervious Cover⁽²⁾ (Acres)	End State Impervious Cover⁽³⁾ (Acres)	Additional Facility Space⁽⁴⁾ (SF)	End State Facility Space⁽⁵⁾ (SF)
6,874.4	1,102.9	2,011.2	2,540,760.5	5,216,780.5
Notes: (1) See <i>Developable Land</i> in Table 2-3. (2) Based on application of Impervious Cover Density Factors (Table 2-5) to projected land development in each land-use category. (3) Assumes current impervious cover of 908.4 acres per Table 2-2. (4) Based on application of Facility Space Density Factors (Table 2-5) to projected land development in each land-use category. (5) Assumes current facility space of 2,676,020 SF per Table 2-2. SF – square feet				

2.1.5 Summary and Discussion

Tyndall AFB consists of 28,460 acres of land, of which approximately 9,045 acres are considered developed. Tyndall AFB land development headspace is considered to be 6,874.4 acres of unconstrained developable land, or approximately 24 percent of total land area. The maximum land development capability for Tyndall AFB involves development of 100 percent of developable land, to include construction of an additional 1,102.9 acres of impervious cover and approximately 2.5 million square feet of additional facility space.

2.2 POPULATION AND HOUSING EVALUATION

2.2.1 Methodology and Background

This section analyzes the capability of Tyndall AFB to accommodate increases in permanent party personnel, primarily from the stand point of on-base housing facilities. The current housing inventory for both accompanied and unaccompanied personnel served as the baseline for this analysis. Maximum development for this resource area was limited by the amount of additional housing that could be constructed on the installation. Future housing options considered in this analysis include both housing construction projects contained in the *General Plan* and conceptual housing construction that was derived from the expansion of the *Unaccompanied and Accompanied Housing* land-use areas in Section 2.1.

2.2.2 Current Population Analysis

The current population of Tyndall AFB, provided by Mr. Jose Cintron, Environmental Planning Lead, Tyndall AFB, is detailed in Table 2-7.

Table 2-7 2007 Population of Tyndall AFB

Category	Living On Base	Living Off Base	Total
Active Duty Permanent Party	707	4,155	4,862
ANG/Reserve Permanent Party	55	182	237
Traditional Guard/Reserve	0	46	46
Military Trainees	0	197	197
Civilian Personnel	2	2,575	2,577
Military Retirees	0	9,269	9,269
Military Dependents	1,634	3,649	5,283
Total	2,398	20,073	22,471
Source: Cintron 2008a			
ANG – Air National Guard			

For the purposes of analyzing Tyndall AFB utility systems, an effective population metric has been developed providing a more accurate representation of the effective 24-hour population that installation utility systems must support. Under this metric, Tyndall AFB personnel who live off base are weighted by a factor of one-third to represent their average 8-hour per day demand on installation utilities. Table 2-8 provides the effective population summary for Tyndall AFB.

Table 2-8 2006 Tyndall AFB Effective Population

Category	Population	Effective Population Factor	Effective Population
On-base Personnel (24-hr population)	2,398	1.00	2,398
Off-base Personnel ⁽¹⁾ (8-hr population)	7,155	0.33	2,361
Total	9,553	--	4,759
Notes:			
⁽¹⁾ Military Dependents and Military Retirees residing off base are not included in the 8-hr population for the installation.			
hr – hour			

2.2.3 Current Housing Capability

Existing population on Tyndall AFB was also characterized by a bedspace analysis across available types of housing. Table 2-9 presents a bedspace analysis for Tyndall AFB as it applies to military members only.

Table 2-9 2007 Bedspace Analysis for Military Members

Housing Facilities	Capacity (persons)	Average Occupancy Rate	Expected Population (persons)
MFH Units	817	90%	735
Dormitories	448 ⁽¹⁾	95%	426
Total	1,265	--	1,161
Source: Barbieri 2008			
Notes:			
⁽¹⁾ Temporary Lodging Facilities are not included in this number.			
MFH – Military Family Housing			

From Table 2-9, Tyndall AFB has a current housing capability for military members of 1,265 and, based upon reported occupancy rates, has approximately 1,161 occupied units. In order to accommodate the Tyndall AFB mission, a certain number of dormitory units must be held available at any given time to house immediately incoming personnel. As a result, housing occupancy rates appear to be higher than then current on-base population. Therefore, for the purpose of estimating available units, these “set-aside” units will be considered occupied. Approximately 92 percent of available housing capacity is considered utilized at Tyndall AFB.

Table 2-10 expands on the existing bedspace analysis to include military dependents residing on base.

Table 2-10 2006 Bedspace Analysis for On-base Residents

	Military	Dependent
Accompanied Housing		
MFH Units	817	2,107 ⁽¹⁾
Unaccompanied Housing		
Dormitories	448	0
Total Current Housing Capacity	1,265	2,107
TOTAL	3,372	
Notes:		
(1) MFH Dependent bedspace based on existing MFH inventory of 184, 2-Bdrm; 425, 3-Bdrm; and 208, 4-Bdrm units (Cintron 2008c). Assuming one Bdrm per military member and spouse and one Bdrm per dependent child, the dependent capacity in MFH is approximately 1.67 times the military member capacity.		
MFH – Military Family Housing		
Bdrm - bedroom		

2.2.4 Future Housing Capability- General Plan

Planned changes to unaccompanied housing at Tyndall AFB include construction of a 120-person Dormitory Complex to replace dormitory Buildings 1150, 1152, and 1154, which would be demolished (Cintron 2007). This would result in a net zero change in unaccompanied bedspace.

Based upon existing MFH occupancy rates and the current installation population, the MFH inventory at Tyndall AFB is expected to be reduced as a part of privatization in the near term.

Additional changes to Tyndall AFB housing as part of the MFH privatization include renovation and construction of MFH units. According to the *Tyndall AFB MFH Privatization EA*, the end state of MFH will be 813 units and all construction, demolition, and renovation activities began in FY05 and will be completed by FY10. Therefore, the total inventory of MFH will be changing over that period of time. Privatization will result in a overall reduction in MFH of 35 units, but would increase total capacity of MFH by nine persons. This is due to the fact that 4-bedroom units will increase over current conditions, while 2- and 3-bedroom units will decrease as analyzed in the EA.

2.2.5 Future Housing Capability – Beyond the General Plan

The Land-use Development analysis found in Section 2.1 provides a conceptual model for growth of the *Unaccompanied and Accompanied Housing* land uses on Tyndall AFB. As the developed area of the installation grows, the proportional growth model suggests that Tyndall AFB housing capability can grow as well. Using the Facility Space Density Factors, a projection of future housing facility space was made for the Unaccompanied and Accompanied land-use areas. Facility planning factors were then used to correlate new housing construction to additional bedspace for military members and dependents. Table 2-11 shows the future bedspace analysis based on the proportional growth model presented in Chapter 2.0.

Table 2-11 Future Bedspace Analysis for On-Base Residents

	Conceptual Housing New Construction⁽¹⁾ (SF)	Gross Area per Person (SF)	Total Additional Personnel⁽⁴⁾
Accompanied Housing	156,968	425 ⁽²⁾	369
Unaccompanied Housing	564,834	532 ⁽³⁾	1,062
Notes: (1) Approximately 4.5 percent and 0.8 percent of new land development would be <i>Accompanied Housing and Unaccompanied Housing</i> , respectively. Conceptual New Housing Construction numbers were developed by multiplying the amount of new land development for each housing type area by the Facility Space Density Factor for that type of housing. (2) Table 4-1 of the <i>MFH Unit Size Standards</i> from the <i>United States Air Force Family Housing Guide for Planning, Programming, Design, and Construction</i> (USAF 2004b) was used to derive an average gross area per person based on benchmark gross SF allowed across all grades and bedroom requirements for new MFH construction. (3) An average was taken between the gross area per person for grades E1-E6 (355 SF) and grades O1-O3 (710 SF) as found in the <i>United States Air Force Unaccompanied Housing Design Guide</i> (USAF 2006a). (4) Because <i>Accompanied Housing</i> gross area per SF factors include all residents, personnel numbers presented here include both military and dependents. MFH – Military Family Housing SF – square feet			

2.2.6 Summary and Discussion

Tyndall AFB currently has a capacity to house approximately 1,265 military members and 2,107 dependents for a total of 3,372 persons. The most recent occupancy numbers indicate that the installation is at approximately 92 percent of its current housing capability. This number includes units set aside to house immediately incoming personnel. The land development model presented in Section 2.1 projects approximately 721,802 square feet of new housing construction. This translates to bedspace for 1,431 additional personnel and dependents with a total potential housing capability of up to 4,803 persons in the accompanied and unaccompanied housing areas, post-MFH privatization and new housing construction. This is a 42 percent increase in bedspace over current conditions.

2.3 UTILITY SYSTEMS EVALUATION

2.3.1 Methodology and Background

This section analyzes the ability of Tyndall AFB utility systems to accommodate future growth and development of the installation. A synopsis of each utility system along with an analysis of each system's capability to accommodate growth development is provided below.

2.3.2 Potable Water

Potable water for Tyndall AFB is provided by the Bay County Water Treatment Plant. Emergency potable water is available from four separate deep wells located on base (AETC 2006). The water source for the Bay County Water Treatment Plant is the Deer Point Reservoir, which is fed by the Floridian Aquifer and four main tributaries. The four main tributaries are: Econfinia Creek, Bear Creek, Cedar Creek, and Bayou George Creek. The Bay County Water Treatment Plant withdraws approximately 50 million gallons of water per day from the Deer Point Reservoir (Bay County 2008). The treatment capacity of the Bay County Water Treatment Plant is currently 40 million gallons per day (MGD), and will increase to 60 MGD after a planned system upgrade (AETC 2006). During the Fiscal Year (FY) 2007, annual water consumption at Tyndall AFB was approximately 354 million gallons or approximately 0.98 MGD (USAF 2007c). The Tyndall AFB potable water system's capacity, including the capability for the Bay County Water Treatment Plant to provide water to the system, is 5 MGD. A 5 million gallon storage tank, property of Bay County, is located east of the air field runway (AETC 2006). Tyndall AFB's stand alone total water storage capacity is approximately 400,000 gallons, which includes two elevated steel storage tanks located on Tyndall AFB. For FY 2007, Tyndall AFB utilized approximately 19 percent of its total potable water capacity.

The *General Plan* classifies the Tyndall AFB water distribution system as "yellow" using the Facility Infrastructure Examination (FIX) system (AETC 2006). A yellow designation states that the system is mission capable, but requires major repair or an upgrade within five years of the designation. The water distribution system is adequate (USAF 2004a). Based upon the *Infrastructure Investment Plan-Water Distribution System*, potable water infrastructure should be replaced at ten locations throughout Tyndall AFB over the course of the next five years (USAF 2007d). The infrastructure to be replaced includes water mains, valves, and fire hydrants that

were installed in the 1940s. It has been identified that these components will exceed their design life within the next five years (USAF 2007d).

The Tyndall AFB potable water distribution system appears to be capable of accommodating any foreseeable installation development, assuming that storage and distribution systems are improved and expanded accordingly.

2.3.3 Wastewater

Tyndall AFB utilizes the Bay County Advanced Wastewater Treatment Plant (AWWTP) and the Silver Flag package wastewater treatment plant to treat and discharge its wastewater. The Bay County AWWTP is an activated sludge, biological nutrient removal five-stage treatment facility (Bay County 2008). The Bay County AWWTP design and permitted capacity is 14 MGD and has an average daily flow of 3.8 MGD (Cintron 2008b). Tyndall AFB is permitted to discharge 1.23 MGD of wastewater to the Bay County AWWTP. In FY 2007, Tyndall AFB discharged approximately 213 million gallons (or approximately 0.58 MGD) of wastewater (USAF 2007c). Tyndall AFB contributes approximately 15 percent of wastewater to the AWWTP, and the Bay County AWWTP receives a total of approximately 3.22 MGD of wastewater from other sources (Cintron 2008b). Based upon these numbers, the influx of wastewater into the Bay County AWWTP can more than triple, allowing for Tyndall AFB to increase wastewater contribution 300 percent with increases to permitted capacity. The Silver Flag wastewater treatment plant has a design capacity of 0.05 MGD with an average daily flow of 0.024 MGD. This allows for a two-fold increase in wastewater contribution to this treatment plant (Cintron 2008b).

The *General Plan* classifies the Tyndall AFB sanitary sewer system as “yellow” using the FIX system. This rating indicates that the system is mission capable, but requires major repair or an upgrade within five years of the designation. Wastewater treatment and the sanitary sewer system at Tyndall AFB would be able to accommodate additional installation development and personnel, assuming that the collection system were improved and expanded to meet the additional development requirements.

2.3.4 Electrical System

Electricity is supplied to Tyndall AFB by Gulf Power Company from a substation located at the west end of the Base. Two 46 kilovolt feeder lines feed the substation, where three bays distribute electricity to three areas of the Base. The electrical distribution system is owned by Tyndall AFB (USAF 2007d). Total electrical consumption for FY 2007 was approximately 112,310 megawatt (MW) hours (MW-hr), or approximately 308 MW-hr per day (USAF 2007c). Gulf Power Company has the capacity to generate 1,939 MW-hr per day of electricity (Gulf Power 2008). During FY 2007, the peak usage by Tyndall AFB was 399 MW-hr in August, which utilized 20 percent of Gulf Power Company’s generation capacity. Based upon the generation capacity and usage statistics on electricity demand, Tyndall AFB could double electricity demand.

The *General Plan* classifies the Tyndall AFB electrical system as “yellow” based upon the FIX system. This rating indicates that the system is mission capable, but requires major repair or upgrade within five years of the designation. Based upon the generation capacity and Tyndall

AFB electricity usage, the system appears to be capable of accommodating any foreseeable installation development, assuming that storage and distribution systems are improved and expanded accordingly. There are no indications that electrical supply to the installation would represent a limiting factor for installation growth and development.

2.3.5 Natural Gas System

Natural gas is supplied to Tyndall AFB by TECO Peoples Gas, which receives the natural gas from Florida Gas Transmission. The natural gas enters Tyndall AFB through a 6-inch transmission line located near the south side of the Dupont Bridge. The natural gas distribution system consists of 14 miles of steel and polyethylene pipes (USAF 2004a). The FY 2007 on-base usage was approximately 116,881 thousand cubic feet (mcf). The average daily demand was approximately 325 mcf and the peak average daily demand occurred during the month of January, with a use of 646 mcf (USAF 2007c). It is estimated that the daily system capacity, using distribution as a limiting factor, is 6,676 mcf (USAF 2004a). Based upon these numbers, natural gas usage can multiply nine-fold.

The 2004 *General Plan* classifies the Tyndall AFB natural gas distribution system as “green” based upon the FIX system. The rating indicates that the system is fully operational and requires only routine maintenance and repair. The natural gas system operates well below capacity and has the available capacity to support additional installation development and increase in personnel.

2.3.6 Summary and Discussion

From a resource capability standpoint, the Tyndall AFB utility systems would not represent a limiting factor for the development scenario presented in this document. Assuming the necessary improvements to installation utility infrastructure would be executed in conjunction with development efforts on Tyndall AFB, all utility resources have capacities that exceed the development capability for land and population growth.

2.4 ADDITIONAL RESOURCE OVERVIEWS

2.4.1 Methodology and Background

This section addresses additional individual resource areas that could present a limiting factor for development at an Air Force installation. Rather than developing specific capacities for these resources, they are evaluated as to whether or not they would present a limiting factor for development at Tyndall AFB.

2.4.2 Air Emissions

Bay County, which includes Tyndall AFB, is currently classified as attainment for all criteria pollutants under the National Ambient Air Quality Standards (NAAQS) (USAF 2006b). The potential is present for Bay County to no longer be classified as attainment for the pollutant ozone. In March 2008, the United States Environmental Protection Agency modified the standard for ozone; Bay County exceeded the standard. This reclassification has the potential to

slightly modify fuel dispensing equipment (FDEP 2008). Tyndall AFB maintains a synthetic minor air permit (known as a Federally Enforceable State Operating Permit in Florida) with multiple emission sources. Based on 2007 Air Emissions data (USAF 2008b), Tyndall AFB operates at approximately 14.7 percent of its permitted emissions limits based on an average across all stationary emission sources and using the most restrictive pollutants. The closest any single emissions source comes to its permitted limit is nitrogen oxides (NO_x) from jet engine testing where 24.08 tons per year (tpy) of NO_x were emitted against a 90 tpy limit (26.8 percent of allowable). With the current level of emissions from Tyndall AFB, there are no plans to curtail operation of any installation mission sources to reduce air emissions (USAF 2006b). Assuming Bay County remains in attainment for the other NAAQS pollutants, which are carbon monoxide, lead, NO_x, particulate matter, and sulfur dioxide; air emissions are not expected to be a significant limiting factor for future development at Tyndall AFB.

2.4.3 Solid Waste

All municipal solid waste generated at Tyndall AFB is collected and transported by a private contractor to the Bay County Waste Energy Facility where it is incinerated to create energy for the County. The Waste Energy Facility, located approximately 18 miles northeast of the installation, is currently permitted to burn 500 tons per day and any excess waste is transported to the Bay County Landfill. The Bay County landfill, located approximately 39 miles northwest of the installation, accepts approximately 84,078.28 tons of solid waste annually, including approximately 2,344.84 tons of construction and demolition waste. Assuming current disposal rates, the remaining life expectancy of the landfill is 22 years. There are plans for expansion, and land has been purchased for future landfill development. Tyndall AFB disposes of approximately 3,430.10 tons of solid waste to the Bay County Waste Energy Facility annually, representing approximately three percent of the overall solid waste handled by the Facility. Solid waste disposal would not represent a limiting factor for development of Tyndall AFB.

2.4.4 Socioeconomics

While the majority of this study is focused on the capability of existing resources on Tyndall AFB to accommodate increased installation development, it is important to note the role of the local community in the development potential for the Base. Development of Tyndall AFB would rely, in part, on the capability of the local community with respect to off-base housing, education, workforce, and economic infrastructure. While these capabilities can generally be considered elastic in that the local community capability would likely expand to meet new requirements, it is possible that installation development could overwhelm the local community in the short-term.

Currently, the City of Panama City, approximately 11 miles northwest of Tyndall AFB, anticipates a population growth rate of 48.05 percent between the years 2006 and 2020, with a growth rate of 3.55 percent per year from 2006-2015, and a 2.02 percent growth rate from 2016-2020 (COPC 2007). It would be expected that the City of Panama City would be able to accommodate this anticipated population increase associated with the future development scenario at Tyndall AFB. Therefore, future growth at the installation would not result in a significant impact to the local community with respect to socioeconomic issues.

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CHAPTER 3

FLYING MISSION CAPABILITY

3.1 METHODOLOGY AND BACKGROUND

This section assesses the ability of Tyndall AFB to absorb additional flying activities, and its capacity to increase its overall flying mission. The assessment considers three factors: (1) predicted noise exposure in the immediate vicinity of the airfield; (2) physical and operational constraints of the airfield and runway complex that limit the throughput of aircraft operations; and (3) the capacity and availability of training airspace for use by additional flying missions based at Tyndall AFB.

This assessment compares two operational intensities or states: first, a current baseline condition, which for this report is the level of operations modeled for FY 2007; and second, an increased level of operations that would represent a maximum throughput capacity for aircraft operations. The maximum throughput would occur because the effects associated with the increase approach a significant limiting factor. For these three elements (noise, throughput, and airspace capacity), there are metrics that are used to establish limits on mission capacity.

3.1.1 Methodology

For predicted noise exposure, the limiting factor is established in the Air Force's AICUZ program as outlined in Air Force Instruction (AFI) 32-7063, dated 13 September 2005. The AFI guidance indicates that a proposed action (such as a beddown) that would result in a change in operations triggering a 2-decibel (dB) increase in the Day-Night Average Sound Level (DNL) over sensitive noise receptors would be a change significant enough to merit a new AICUZ study.

For airfield capacity, the limiting factor is the number of operations (take offs or landings) that the airfield is able to accommodate in a given period of time, normally expressed in hourly or annual terms. Air Force Handbook (AFH) 32-1084 Facility Requirements dated 1 September 1996 addresses the detailed methodology for calculating this constraint; it is a function of the mix of aircraft that use the airfield, the runway geometry, and similar factors.

For capacity and availability of training airspace, the relevant metrics are: the minimum required airspace volume, the utilization rates, and the distance to the airspace. The 2008 *Tyndall AFB Natural Infrastructure Assessment* sets forth measures and indices for assessing development potential for the installation, including the ability of the airfield and associated training airspace to absorb additional operations.

3.1.1.1 Environmental Noise

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities such as communication or sleep. A human's reaction to noise varies according to the duration, type, and characteristics of the source, distance between the source and receiver, receiver's sensitivity, background noise level, and time of day.

The unit of measure used to quantify noise is the dB. It is a logarithmic ratio of the increase in atmospheric pressure that a sound event causes, compared to a defined reference pressure, which is the lowest detectable pressure recognized by the human ear (0.00002 Pascals). When using dBs to depict airborne sound pressure levels, zero dB is the threshold of human hearing and exponential increases occur every 10 dB. An event that generates 60 dB of sound is 10 times louder than one that generates 50 dB. In addition to quantifying the pressure of a noise event, the quality of noise is described in terms of frequency or cycles per second (expressed as Hertz [Hz]). While the human ear can detect sound over a very wide spectrum of frequencies, from 20 to 15,000 Hz, it is particularly well adapted to perceiving sounds at the middle range. An “A-weighted” dB is a dB corrected or weighted to reflect those frequencies heard especially well by humans.

The two basic ways of quantifying noise are to either describe it in terms of its peak intensity or in terms of a cumulative sum of energy averaged over a time duration. For assessing aircraft operations in the vicinity of an airfield, the DNL is the most widely accepted metric. As implied in its name, it is a cumulative exposure metric that sums the energy from individual noise events and spreads that over a 24-hour period, with an additional 10 dB added to those events occurring between 2200 and 0700 hours. The DNL is accepted by the Department of Defense (DoD), the Federal Aviation Administration (FAA), and several other agencies as the preferred metric for describing noise because it lends itself to comparing predicted noise exposure across various locations or in the same location across various time spans. For multiple event triggers, such as repetitive aircraft overflights along the same point on the ground, it provides a way to account for intensity, duration, and repetition of the events in order to compare cumulative exposure levels. Further, sociological studies indicate that there is a correlation between particular DNL values and community annoyance.

3.1.1.2 Noise From Aircraft Operations

The Air Force uses computer modeling to predict noise exposure in the vicinity of its airfields. The modeling software, NoiseMap 7.0, produces a grid of points and calculates the DNL for each point based on noise measurement data for flyovers and static engine run-ups; these data have been collected by the Armstrong Laboratory at Wright-Patterson AFB over the past 25 years. The operational flight profile characteristics specific to flying activities at Tyndall AFB were collected and put into the model. Specifically, a data collection team visited Tyndall AFB in March 2007 to determine from pilots, maintenance personnel, and air traffic control personnel the flight tracks, flight profile (altitude, airspeed, and power settings), and operations counts to be modeled. Operations are broken down into phases of flight, specifically departures, arrivals, and closed pattern circuits.

3.1.2 Runway Complex/Airfield Capacity

The Air Force uses two primary measures, expressed in terms of operations per unit of time, to describe airfield capacity. As outlined in AFH 32-1084 Facility Requirements, the first metric is called Practical Hourly Capacity (PHOCAP) and the other is Practical Annual Capacity (PANCAP). These measures take into account the flight rules and meteorological conditions under which the aircraft are operating (Visual Flight Rules [VFR] or Instrument Flight Rules

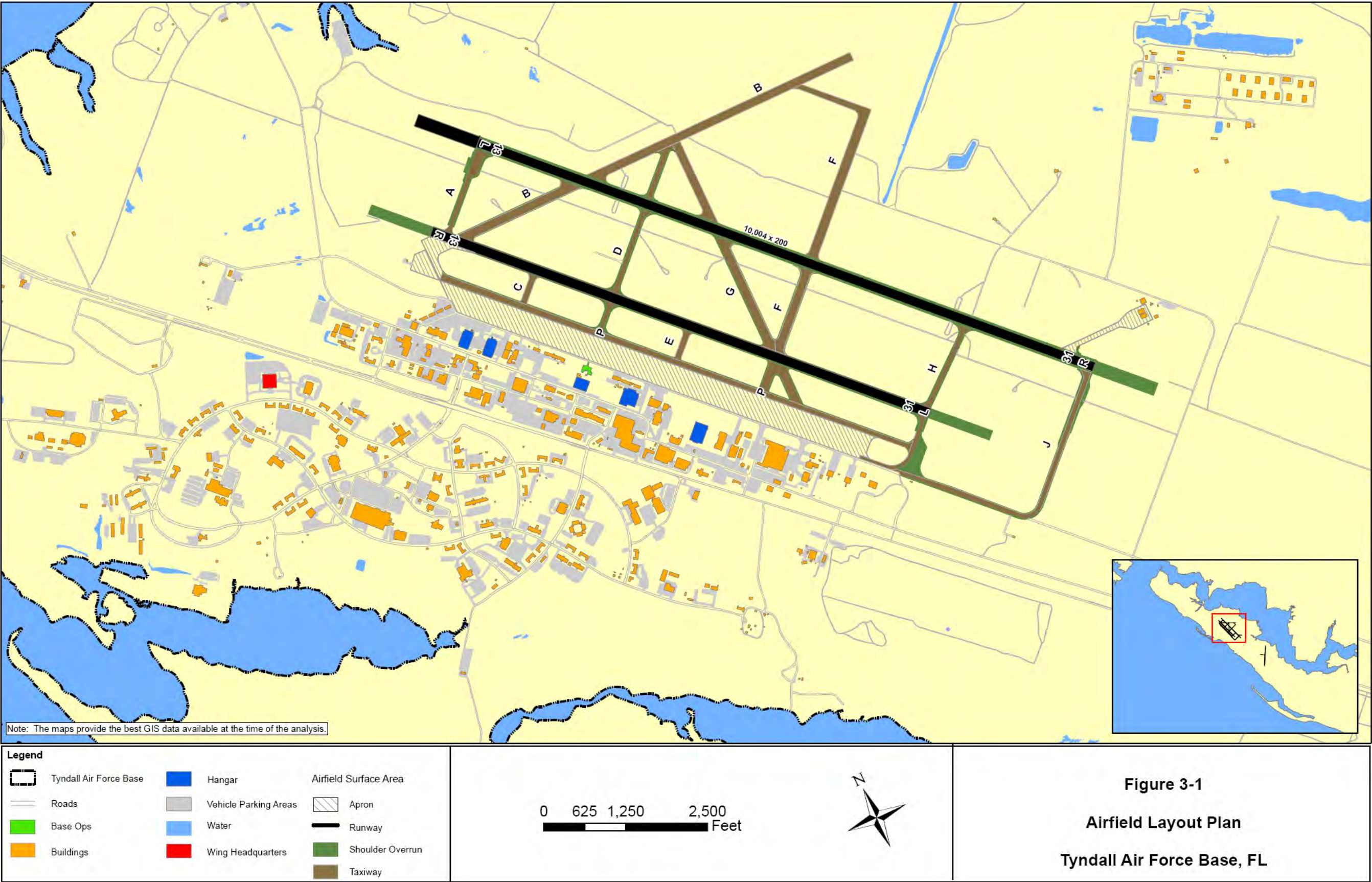
[IFR]), the runway geometry (parallel runways with sufficient lateral separation to permit simultaneous arrivals and departures), and other considerations.

The airfield at Tyndall AFB consists of two parallel runways, spaced relatively closely together (Figure 3-1). Runway 13R/31L is the innermost or inside runway (with respect to the aircraft parking ramps and hangars). Runway 13L/31R is the outermost runway (with respect to the aircraft parking ramps and hangars). The runways are each 150 feet wide and, from centerline to centerline, the distance separating them is 1,525 feet.

For the purpose of calculating PHOCAP and PANCAP, the two runways have sufficient separation to permit simultaneous operations under VFR only. Air traffic control procedures and minimum aircraft separation standards permit simultaneous approaches under VFR for runways separated by more than 700 feet. The Unified Facility Criteria (UFC) 3-260-01 Airfield and Heliport Planning and Design calls for a minimum separation of 1,000 feet. The parallel runways meet these minimum separation standards.

Applying the standards of AFH 32-1084 to the parallel runway configuration found at Tyndall AFB, simultaneous approaches under IFR are not permitted. The inside runway (13R/31L) does not have any ground-based navigation transmitters that would provide the course guidance to allow separate precision instrument approaches to each runway (i.e., a separate Instrument Landing System); however, the Tyndall Radar Approach Control does provide precision approach radar (PAR) to all runways (including the inside runway). This is a very labor-intensive effort. In practice, simultaneous precision instrument arrivals do not occur to the parallel runways. Under IFR, a minimum separation of 2,500 feet between parallel runway centerlines is required for simultaneous approaches. Therefore, under IFR, Tyndall AFB does not gain the increased throughput of having multiple runways. However, for operations under VFR, Tyndall AFB does see an increase in capacity because simultaneous operations to both runways can and do occur.

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3.1.3 Current Aircraft Operations

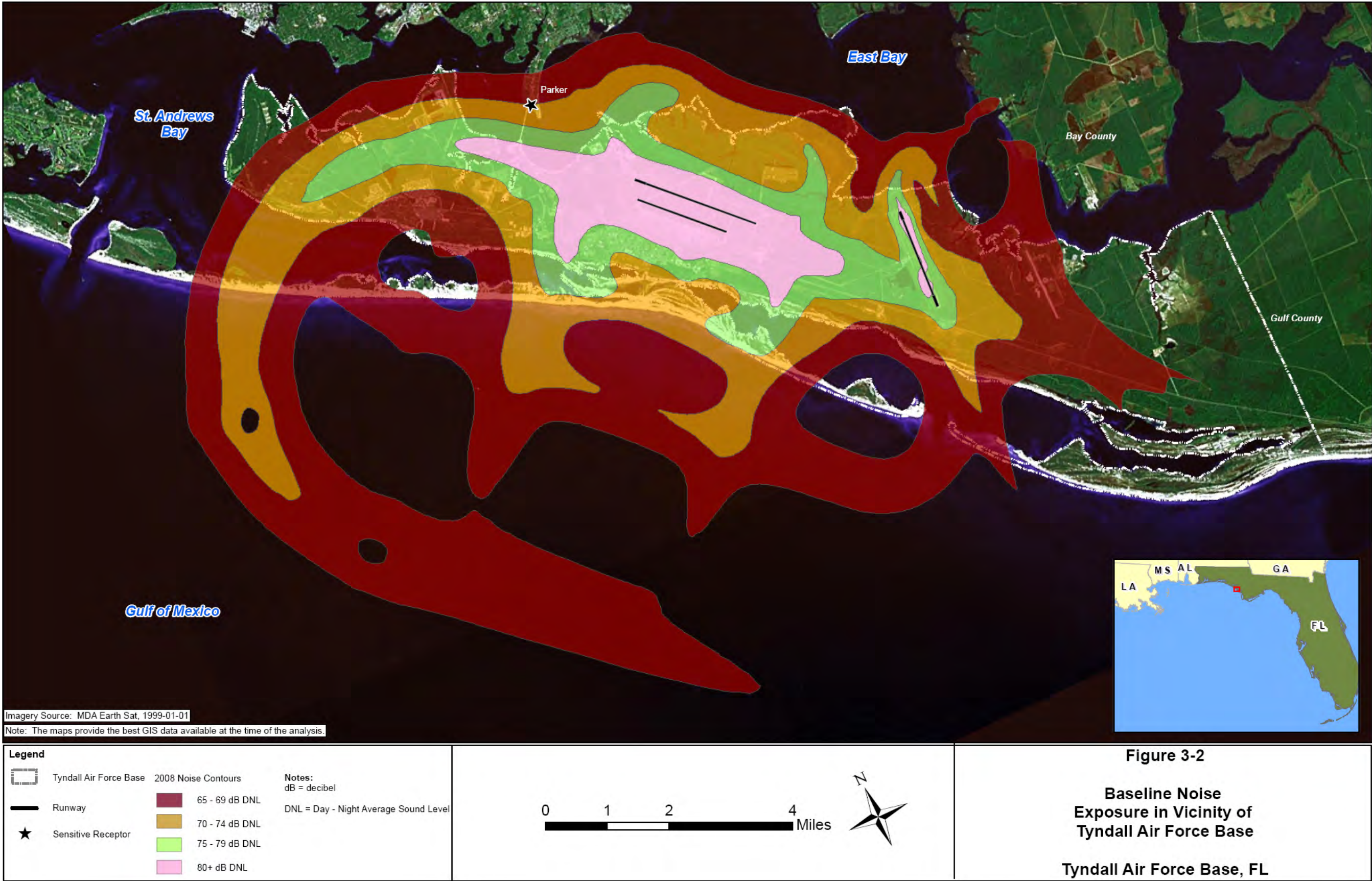
Under baseline conditions, approximately 114,000 annual aviation operations occur at Tyndall AFB (Table 3-1). The mix of aircraft stationed at Tyndall AFB includes the F-15 Eagle, a twin engine fighter; the F-22 Raptor, also a twin engine fighter; and the MU-2 Mitsubishi, a turbo-propeller driven training aircraft. Additionally, a wide variety of transient aircraft use Tyndall AFB over the course of a given year, including heavy cargo jet aircraft, bombers, and fighters from other Air Force bases.

In recognition that the Air Force seldom flies at the same rates on weekends and holidays that it does during the 5-day workweek, the concept of an “average busy day” is employed so as to not understate the predicted noise exposure. Annual operations are divided by the number of flying days or weekdays in a year (usually 260) in order to arrive at the number of operations expected to occur on an average busy day at an airfield. Specifically, for the F-22 and F-15, a divisor of 244 days per year was used and 260 days were used as the divisor for the MU-2. The divisors for transient and Aero Club aircraft were 356 and 312 days, respectively. The number of operations along the flight tracks and the profile data form the essential elements of the inputs to the noise model. Additionally, climatology, maintenance locations, runway utilization, and other factors are considered.

Once the predicted noise exposure values along the grid are calculated, points having equal values are plotted and depicted as noise contour lines. The contours are shown in 5 dB intervals beginning at 65 dB DNL and continuing to the 80+ dB interval. The areas with the highest values typically are closest to the runway, with diminishing values as the distance from the runway increases, normally along an axis corresponding to the flight tracks. Over 50,000 acres are exposed to elevated noise levels; however, most of the acreage exposed area is over water (Table 3-2). The off-base (excluding water) noise contours associated with baseline flight activities at Tyndall AFB run along a northwest-southeast axis (Figure 3-2) and encompass over 450 acres of land (Table 3-3).

Table 3-1 Baseline⁽¹⁾ Average Busy-Day Aircraft Operations⁽²⁾ at Tyndall AFB

	Tyndall Annual Operations			Tyndall Average Daily Operations		
	Arrivals ⁽¹⁾ Departures	Closed Patterns	Total	Arrivals ⁽¹⁾ Departures	Closed Patterns	Total
Aero Club						
C 172	5,616	0	5,616	18.00	0.00	18.00
C 210	104	0	104	0.33	0.00	0.33
Subtotal	5,720	0	5,720	18.33	0.00	18.33
Based⁽³⁾						
F-15	18,066	44,686	62,752	73.92	182.84	256.76
F-22	10,641	21,087	31,728	43.54	86.28	129.82
Subtotal	28,707	65,773	94,480	117.46	269.12	386.58
Air 1st (MU-2)	4,160	0	4,160	16.00	0.00	16.00
WSEP						
F-15A	214	0	214	1.62	0.00	1.62
F-15E	416	0	416	3.15	0.00	3.15
F-16A	214	0	214	1.62	0.00	1.62
F-16C	1,628	0	1,628	12.33	0.00	12.33
F-22	364	0	364	2.76	0.00	2.76
GR-1	50	0	50	0.38	0.00	0.38
Subtotal	2,886	0	2,886	21.86	0.00	21.86
WEG						
E-9	491	0	491	1.89	0.00	1.89
QF-4	1,124	1,506	2,630	4.60	6.16	10.76
Subtotal	1,615	1,506	3,121	6.49	6.16	12.65
Transient						
KC-135	210	0	210	0.59	0.00	0.59
UH-60	39	0	39	0.11	0.00	0.11
C-21	192	0	192	0.54	0.00	0.54
F-18	75	0	75	0.21	0.00	0.21
KC-10	135	0	135	0.38	0.00	0.38
C-130	395	0	395	1.11	0.00	1.11
T-38	509	513	1,022	1.43	1.44	2.87
F-22A	171	0	171	0.48	0.00	0.48
F-15A	765	762	1,527	2.15	2.14	4.29
F-16C	125	0	125	0.35	0.00	0.35
T-34	53	0	53	0.15	0.00	0.15
Subtotal	2,669	1,275	3,944	7.50	3.58	11.08
Total	45,757	68,554	114,311	187.64	278.86	466.50
Source: Air Force 2007e ⁽¹⁾ Note: Baseline indicates data published in 2008 AICUZ report ⁽²⁾ Note: An operation is one departure (take-off) or one arrival (landing). A closed pattern consists of two operations (i.e., one departure and one arrival). ⁽³⁾ Note: The divisor for the average busy day is 244.4 which rounds to 244. WEG - Weapons Evaluation Group WSEP - Weapons System Evaluation Program						



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Table 3-2 Area Exposed to Elevated Noise Levels

Noise Level DNL	Baseline: Land Area (In Acres)
65 to 69	29,676
70 to 74	14,221
75 to 80	6,641.4
>80	4187.5
Total	54,725.9
Source: GMI 2008	

**Table 3-3 Land Area Exposed to Elevated Noise Levels
(Off Base and Excluding Water)**

Noise Level DNL	Baseline: Land Area (In Acres)
65 to 69	303
70 to 74	153
75 to 80	0
>80	0
Total	456
Source: Air Force 2007e	

In order to establish the maximum number of operations that could occur at Tyndall AFB from the perspective of predicted noise exposure, a sensitive noise receptor was identified by installation personnel, and the predicted noise exposure at that point was calculated for the baseline scenario. Base personnel identified the community of Parker, Florida (north of Tyndall AFB and across St. Andrews Bay from the installation) as a sensitive noise receptor (Table 3-4).

Table 3-4 Noise Exposure at Sensitive Receptors

Point Identification	Location/Sensitive Receptor	Baseline: Noise Level (DNL)
1	Community of Parker, Florida (30° 6' 29.38" N; 85° 36' 13.96"W)	70.3 dB
Source: GMI 2008		
dB - decibel		
DNL - Day-Night Average Sound Level		

After establishing the baseline predicted noise exposure at this location, the number of operations that would be required to increase that exposure by 2 dB DNL was calculated. Since the aircraft stationed at Tyndall AFB vary in the amount of noise they generate, several scenarios would be possible to arrive at the same increase. The scenario chosen was the one that would increase all based aircraft operations equally. This scenario was chosen to represent a realistic situation that could most likely occur.

3.2 AVIATION RESOURCES CAPACITY

3.2.1 Aircraft Operations

In order to assess the potential for increased operational intensity at Tyndall AFB, all based aircraft flight operations were hypothetically increased, and the increase in predicted noise exposure at the sensitive receptors was calculated. Once predicted noise exposure at the sensitive receptor was increased by 2 dB DNL, the criteria identified by the Air Force in its instructions governing the AICUZ program for a significant change in noise exposure would be met. In the case of operations at Tyndall AFB, this would not occur until operations were increased by 60 percent for all aircraft operations. This would be an increase to 100,404 operations for the F-15, and 50,764 operations for the F-22 (Table 3-5). This represents a maximum flying activity scenario.

A comparison between the 65 dB DNL (the noise contour associated with these increased activity levels) and the baseline 65 dB DNL contour shows that the contour associated with the maximum flying activity level would extend further along the northwest-southeast axis than does the baseline contour previously described. The contours lengthen somewhat more than they widen, which is consistent with an increase in operations over a given point on the ground as opposed to an increase in intensity or loudness of the same number of aircraft; in which case the contours widen (Figure 3-3). However, the vast majority of this increase would occur over water, given the Base's proximity to the Gulf of Mexico and to St. Andrew Bay. The change in land area exposed to increased noise compared to the baseline conditions would be over 16,051 acres (Table 3-6). The change in land area off base and excluding water that would be exposed to elevated noise levels would be approximately 698 acres (Table 3-7).

Table 3-5 Potential Development Alternative (2 dB increase from Baseline)⁽¹⁾

	Tyndall Annual Operations			Tyndall Average Daily Operations		
	Arrivals ⁽²⁾ Departures	Closed Patterns	Total	Arrivals ⁽²⁾ Departures	Closed Patterns	Total
Aero Club						
C 172	8,986	0	8,986	28.8	0	28.8
C 210	166	0	166	0.53328	0	0.53328
Subtotal	9,152	0	9,152	29.33328	0	29.33328
Based⁽³⁾						
F-15	28,906	71,498	100,404	118.272	292.544	410.816
F-22	17,025	33,739	50,764	69.664	138.048	207.712
Subtotal	45,931	105,237	151,168	187.936	430.592	618.528
Air 1st (MU-2)	6,656	0	6,656	25.6	0	25.6
WSEP						
F-15A	342	0	342	2.592	0	2.592
F-15E	666	0	666	5.04	0	5.04
F-16A	342	0	342	2.592	0	2.592
F-16C	2,605	0	2,605	19.728	0	19.728
F-22	582	0	582	4.416	0	4.416
GR-1	80	0	80	0.608	0	0.608
Subtotal	4,617	0	4,617	34.976	0	34.976
WEG						
E-9	786	0	785	3.024	0	3.024
QF-4	1,798	2,410	4,208	7.36	9.856	17.216
Subtotal	2,584	2,410	4,993	10.384	9.856	20.24
Transient						
KC-135	336	0	336	0.944	0	0.944
UH-60	62	0	62	0.176	0	0.176
C-21	307	0	307	0.864	0	0.864
F-18	120	0	120	0.336	0	0.336
KC-10	216	0	216	0.608	0	0.608
C-130	632	0	632	1.776	0	1.776
T-38	814	821	1,635	2.288	2.304	4.592
F-22A	274	0	274	0.768	0	0.768
F-15A	1,224	1,219	2,443	3.44	3.424	6.864
F-16C	200	0	200	0.56	0	0.56
T-34	85	0	85	0.24	0	0.24
Subtotal	4,270	2,040	6,310	12	5.728	17.728
Total	73,211	109,686	182,897	300.2293	446.176	746.4053

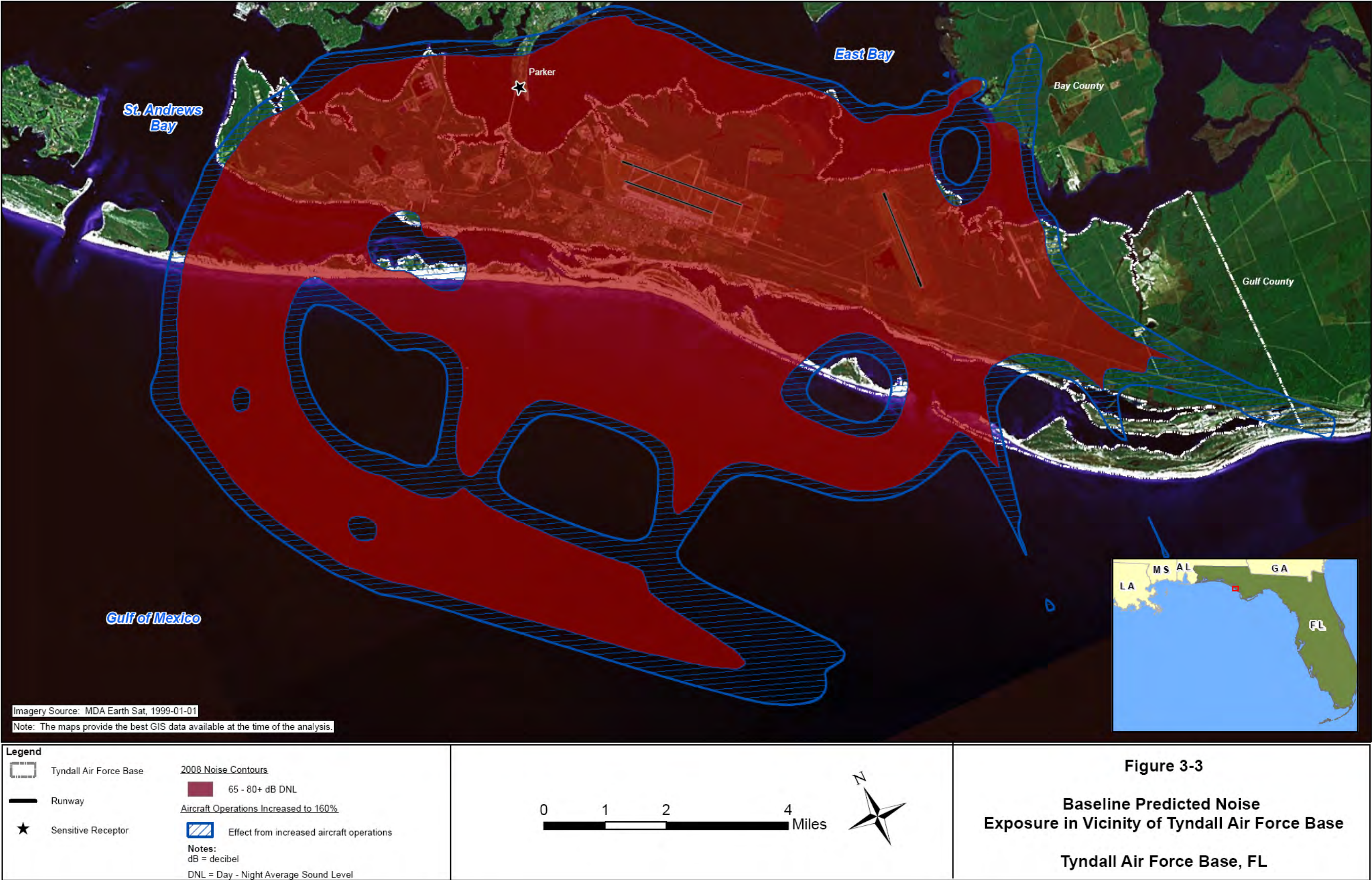
Source: Air Force 2007e and GMI 2008

⁽¹⁾ Note: The scaling is to the Baseline data. Sample point chosen was Community of Parker (30° 6' 29.38 N; 85° 36' 13.96W). In order to increase the DNL by 2 dB, all based and transient aircraft operations (i.e., F-22, F-15, and F-16C) can increase by 60 percent. The annual numbers have been rounded to the nearest whole number and annual totals may not add due to rounding.

⁽²⁾ Note: An operation is one departure (take-off) or one arrival (landing). A closed pattern consists of two operations (i.e., one departure and one arrival).

⁽³⁾ Note: The divisor for the average busy day is 244.4 which rounds to 244.

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**Table 3-6 Comparison of Area Exposed to Elevated Noise Levels
(Baseline versus Potential Development Alternative)**

Noise Level (DNL)	Baseline: Land Area (In Acres)	Potential Development Alternative: Land Area (In Acres)
65 to 69	29,676	36,006
70 to 74	14,221	18,988
75 to 80	6,641.4	9,607
>80	4,187.5	6,176.3
Total	54,725.9	70,777.3
Source: GMI 2008		

**Table 3-7 Comparison of Land Area Exposed to Elevated Noise Levels
(Off Base and Excluding Water)**

Noise Level DNL	Baseline: Land Area (In Acres)	Potential Development Alternative: Land Area (In Acres)
65 to 69	303	949
70 to 74	153	145
75 to 80	0	60
>80	0	0
Total	456	1,154
Source: Air Force 2008 and GMI 2008		
DNL = Day-Night Average Sound Level		

3.2.2 Airfield Capacity

As previously noted, many factors influence the airfield capacity, including: air traffic control considerations, runway geometry, prevailing meteorological conditions (including winds and precipitation), and the mix of aircraft model types that make use of an airfield. For this document, the runway capacity is assessed using AFH 32-1084 Facility Requirements, which draws heavily from civilian airport capacity analysis standards developed by the FAA and published in Advisory Circular 150/5060-5 Airport Capacity and Delay. Capacity assumptions, whether expressed in terms of annual operations or hourly VFR or IFR operations, are based on runway utilizations that produce the highest sustainable capacity consistent with current air traffic control practices and current regulations governing flight operations.

The first measure is PANCAP, which is an annual theoretical throughput for an airfield runway complex. For a runway configuration such as that found at Tyndall AFB, a dual-parallel runway configuration is used for calculating IFR operations. However, only Runway 13R/31L has the requisite ground-based navigation transmitters that would allow precision approaches. Applying the relevant standard from AFH 32-1084 (Table 2-3, page 26 “Configuration Layout B – Close Parallels – IFR Dependent” with an aircraft mix of “3”), the PANCAP would be 355,000 operations per year. It is important to note the limitations of this metric; PANCAP was developed to assist the FAA and airport operators serving air carrier operations (i.e., airports with scheduled airline service) in their facility planning process. While useful to DoD facility

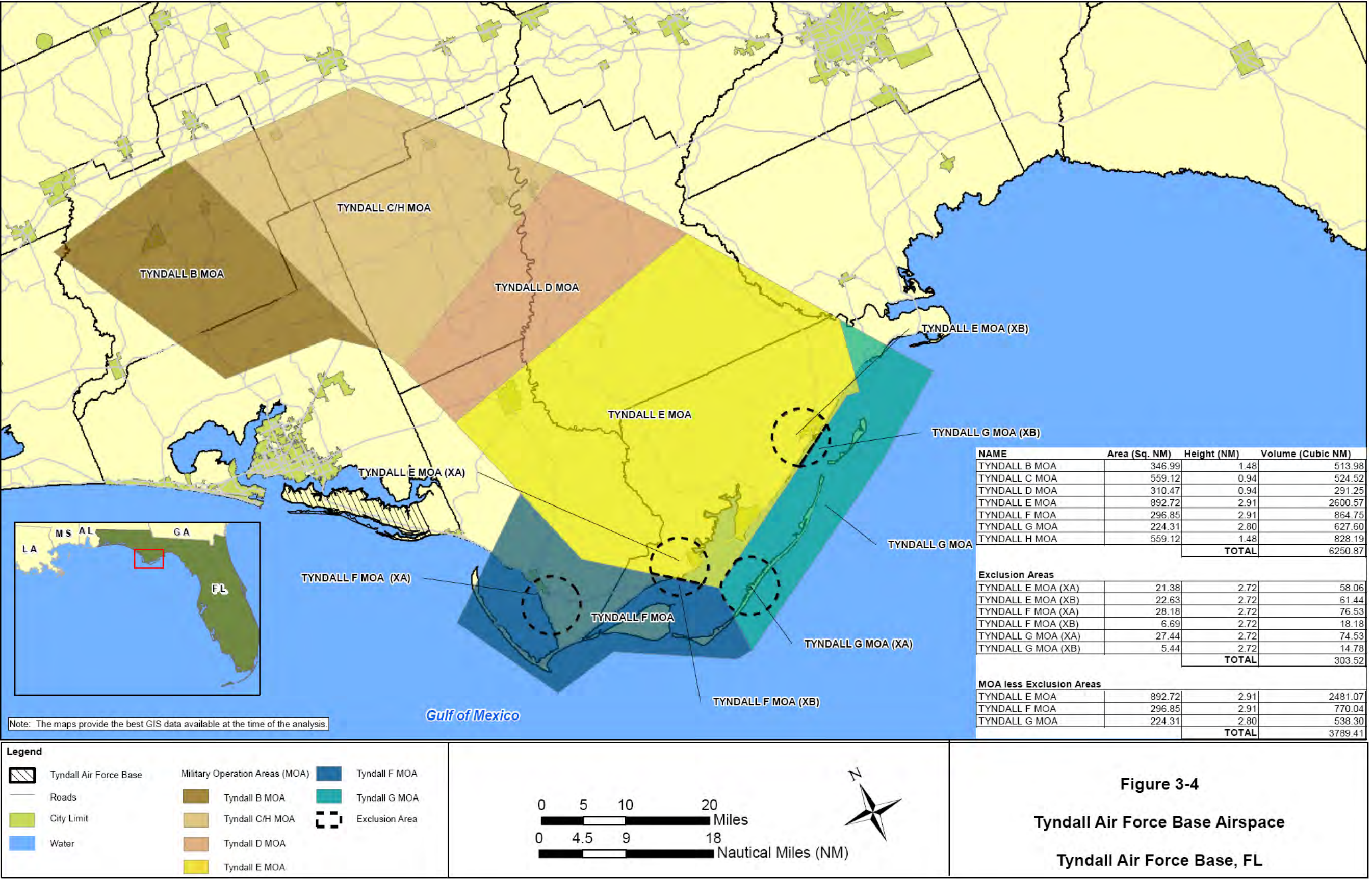
planners, there are inherent operational differences between a flight training base or a base conducting evaluation of weapons or tactics, and a large-scale commercial airport such as Atlanta's Hartsfield-Jackson International Airport. Compared to operations conducted at air carrier airports, flying activities in a training base environment rely upon operations occurring under VFR (particularly for recoveries and closed pattern circuits) much more than they operate under IFR. Therefore, it is possible that Tyndall AFB is able to accommodate more flight operations per year than what PANCAP indicates is a theoretical maximum.

A second relevant measure for describing runway throughput capacity at Tyndall AFB is the PHOCAP. This metric is broken down into IFR and VFR hourly numbers. Again, applying the relevant sketch from AFH 32-1084 (Configuration Layout B – Close Parallels – IFR Dependent” with an aircraft mix of “3”) yields a PHOCAP of 108 VFR and 55 IFR operations per hour. Assuming a 15-hour flying day (0700 to 2200 hours) and 260 flying days per year, the yield would be a theoretical VFR capacity of 449,280 annual operations. The IFR capacity would be 214,500 operations. If additional capacity were required, the installation could expand its flying window, either by flying on weekends, increasing the length of the training day, or both.

There is sufficient runway throughput capacity for the airfield at Tyndall AFB to accommodate a 60 percent increase in operations of all based aircraft. Current operations of all aircraft at Tyndall AFB were 114,311 in FY 2006. Increasing all based aircraft operations would only increase the overall operations counts to 182,897 which are still under the overall theoretical capacity of the airfield.

3.2.3 Airspace Utilization and Management

The previously referenced *Natural Infrastructure Assessment* prepared for Tyndall AFB did not identify training airspace as a constraint on current or future operations. The Military Operation Areas under Tyndall AFB's management encompass over 3,000 square miles with altitudes ranging from 18,000 feet above sea level down to as low as 300 feet above ground level (AGL) (Figure 3-4). They also are relatively nearby, with minimal flight times required for access. Additionally, the installation has access to Warning Areas offshore that are managed by Eglin AFB.



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To assess airspace capacity, it is useful to describe typical daily levels of activity at Tyndall AFB. The mission of the Base is to train pilots in model specific Fighter Transition Training subsequent to their receiving Introduction to Fighter Fundamentals training elsewhere. An additional mission is to train air battle controllers. A third mission is to conduct evaluations of weapons and tactics. As noted above in Section 3.1.3, there are several different aircraft models assigned to or regularly operating from the Base, each with a particular role in the missions.

The minimum airspace areas and volumes (size) of required training airspace primarily depends upon the flight and operational characteristics of the aircraft that use it along with other factors. The minimum size and volume vary by aircraft types and phase of the training syllabus because the airspeeds and climb performance of the three types of training aircraft vary, as do the required maneuvers throughout the course of instruction.

The Air Education and Training Command (AETC) instruction (AETC Instruction 13-201) for minimum airspace dimensions does not depict recommended sizes for the F-15, F-16 or F-22 airframe. Therefore the *Natural Infrastructure Assessment* relied upon interviews with installation airfield and airspace management personnel. Interviews and data collected during the *Natural Infrastructure Assessment* process earlier in 2008 indicated that the special use airspace (SUA) used by aircraft stationed at Tyndall AFB is relatively free from encroachment and is available, as needed, for the current mission.

If a beddown of additional aircraft were proposed for Tyndall, a test and training space needs statement specific to that proposal would be developed to ascertain whether designation of additional SUA would be warranted. Present indications are that current operations are unconstrained by training airspace limitations.

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CHAPTER 4

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Appendix A

GIS Calculations

General Plan Total Installation Acreage	29,069.0
Natural Infrastructure Assessment Report Total Installation Acreage	28,460.1

Land Use in Developed Areas			Future Land Use in Developed Areas from General Plan		
Land-use Type	Acres	Percentage	Future Acres	Percentage	Change
Administrative	111.7	0.4%	197.5	0.7%	85.8
Airfield	2529.6	8.9%	2666.5	9.4%	136.9
Aircraft Ops and Maintenance	152.5	0.5%	177.2	0.6%	24.7
Community-Commerical	78.6	0.3%	74.4	0.3%	-4.3
Community-Service	55.8	0.2%	63.7	0.2%	7.9
Housing-Accompanied	404.0	1.4%	694.4	2.4%	290.4
Housing-Unaccompanied	73.0	0.3%	103.0	0.4%	30.0
Industrial	2533.3	8.9%	2612.5	9.2%	79.2
Medical	26.5	0.1%	31.1	0.1%	4.6
Open Space	19414.7	68.2%	18682.5	65.6%	-732.1
Outdoor Recreation	2176.5	7.6%	2200.0	7.7%	23.4
Training	904.0	3.2%	957.3	3.4%	53.3
Total	28460.1	100.0%	28460.1	100.0%	

Developed Impervious Land Use		
Land-use Type	Acres	Percentage
Administrative	39.4	4.3%
Airfield	358.1	39.4%
Aircraft Ops and Maintenance	94.3	10.4%
Community-Commerical	36.5	4.0%
Community-Service	15.1	1.7%
Housing-Accompanied	112.3	12.4%
Housing-Unaccompanied	29.7	3.3%
Industrial	123.3	13.6%
Medical	12.0	1.3%
Open Space		
Outdoor Recreation	29.3	3.2%
Training	58.3	6.4%
Total	908.3	100.0%

Tyndall AFB Land Balance

Category	Total
Total Land Area	28,460.1
Installation Facilities (SF)	2,676,020.0
Total Developed Land	9,045.4
Undeveloped Land/Open Space	19,414.7

Total Constrained Acres	Current Acres	Unconstrained Acres	Constrained Acres
Administrative	111.7	108.9	2.8
Airfield	2,529.6	710.3	1,819.3
Aircraft Ops and Maintenance	152.5	64.7	87.8
Community-Commerical	78.6	70.7	7.9
Community-Service	55.8	43.1	12.7
Housing-Accompanied	404.0	359.8	44.3
Housing-Unaccompanied	73.0	72.0	0.9
Industrial	2,533.3	322.3	2,210.9
Medical	26.5	26.5	0.0
Open Space	19,414.7	6,874.4	12,540.3
Outdoor Recreation	2,176.5	583.9	1,592.7
Training	904.0	563.2	340.8
Total	28,460.1	9,799.8	18,660.3

Total Open Space	19,414.7
Total Constrained Open Space	12,540.3
Total Developable Acres	6,874.4

Land Use and Development Intensity

Land-use Category	Land Use Distribution	Developed Area (Acres)	Existing Impervious Cover (Acres)	Impervious Cover Density Factor	Existing Facility Space (SF)	Existing Facility Space (Acres)	Facility Space Density Factor
Administrative	0.4%	111.7	39.4	35.3%	470,206	10.8	9.7%
Airfield	8.9%	2,529.6	358.1	14.2%	21,274	0.5	0.0%
Aircraft Operations and Maintenance	0.5%	152.5	94.3	61.8%	278,329	6.4	4.2%
Community Commercial	0.3%	78.6	36.5	46.4%	177,032	4.1	5.2%
Community Service	0.2%	55.8	15.1	27.1%	244,874	5.6	10.1%
Housing Accompanied	1.4%	404.0	112.3	27.8%	98,878	2.3	0.6%
Housing Unaccompanied	0.3%	73.0	29.7	40.7%	441,329	10.1	13.9%
Industrial	8.9%	2,533.3	123.3	4.9%	672,865	15.4	0.6%
Medical	0.1%	26.5	12.0	45.3%	40,665	0.9	3.5%
Open Space	68.2%	19,414.7		0.0%	0	0.0	0.0%
Outdoor Recreation	7.6%	2,176.5	29.3	10.0%	74,606	1.7	0.1%
Training Campus	3.2%	904.0	58.3	6.4%	155,962	3.6	0.4%
		28,460.1	908.3		2,676,020	61.4	

Impervious Cover Density Factor equals existing impervious cover area in each land use category (acres) divided by the area of each land use category (acres) as found in Table 2-2 of the Capability Analysis. Facility Space Density Factor equals existing facility space in each land use category (acres) divided by the area of each land use category (acres) as found in Table 2-2 of the Capability Analysis.

Land Development Model

Natural Infrastructure Assessment Report Developable Parcels

Future Land-use Distribution (General Plan)			
Land-use Type	Existing Acres	Future Acres	Change
Administrative	111.7	197.5	85.8
Airfield	2,529.6	2,666.5	136.9
Aircraft Operations	152.5	177.2	24.7
Community-Commerical	78.6	74.4	-4.3
Community-Service	55.8	63.7	7.9
Housing-Accompanied	404.0	694.4	290.4
Housing-Unaccompanied	73.0	103.0	30.0
Industrial	2,533.3	2,612.5	79.2
Medical	26.5	31.1	4.6
Open Space	19,414.7	18,682.5	-732.1
Outdoor Recreation	2,176.5	2,200.0	23.4
Training	904.0	957.3	53.3
Total	28,460.1	28,460.1	

Developable Parcels	General Plan use of Open Space in Future Land Use	Remaining Developable Parcels
6,874.4	732.1	6,142.2

Conceptual Development (from Developable Acres minus General Plan Development)

Land-use Type	Existing Acres	Percentage of Total	Additional Development
Administrative	111.7	1.2%	75.8
Airfield	2,529.6	28.0%	1,717.7
Aircraft Operations	152.5	1.7%	103.5
Community-Commerical	78.6	0.9%	53.4
Community-Service	55.8	0.6%	37.9
Housing-Accompanied	404.0	4.5%	274.3
Housing-Unaccompanied	73.0	0.8%	49.5
Industrial	2,533.3	28.0%	1,720.2
Medical	26.5	0.3%	18.0
Open Space	0.0	0.0%	0.0
Outdoor Recreation	2,176.5	24.1%	1,478.0
Training	904.0	10.0%	613.8
Total	9,045.4	100.0%	6,142.2

* Notes: Additional Development is calculated by multiplying percentage of total by developable parcels
New Total Land-use Acreage for Open Space removes the 7,857.6 acres of developable land

Land Development Model, Continued

Land-use Type	Existing Acres	General Plan Development	Conceptual Development	Addition/subtraction from baseline	New Land-use Total
Administrative	111.7	85.8	75.8	161.7	273.4
Airfield	2,529.6	136.9	1,717.7	1,854.6	4,384.3
Aircraft Operations	152.5	24.7	103.5	128.3	280.7
Community-Commercial	78.6	-4.3	53.4	49.1	127.8
Community-Service	55.8	7.9	37.9	45.8	101.6
Housing-Accompanied	404.0	290.4	274.3	564.8	968.8
Housing-Unaccompanied	73.0	30.0	49.5	79.5	152.5
Industrial	2,533.3	79.2	1,720.2	1,799.4	4,332.7
Medical	26.5	4.6	18.0	22.6	49.0
Open Space	19,414.7	-732.1	-6,142.2	-6,874.4	12,540.3
Outdoor Recreation	2,176.5	23.4	1,478.0	1,501.4	3,677.9
Training	904.0	53.3	613.8	667.2	1,571.1
Total	28,460.1	0.0	0.0	0.0	28,460.1

Land-use Type	New Total Land Use Acreage	Impervious Cover Density Factor	Total Impervious Cover	Total New Impervious Cover	Facility Space Density Factor	Total Facility Space (SF)	Total New Facility Space (SF)
Administrative	273.4	35.3%	96.4	57.0	9.7%	1,150,869.6	680,663.6
Airfield	4,384.3	14.2%	620.7	262.6	0.0%	36,871.1	15,597.1
Aircraft Operations	280.7	61.8%	173.6	79.3	4.2%	512,456.5	234,127.5
Community-Commercial	127.8	46.4%	59.2	22.8	5.2%	287,664.9	110,632.9
Community-Service	101.6	27.1%	27.5	12.4	10.1%	446,049.0	201,175.0
Housing-Accompanied	968.8	27.8%	269.4	157.0	0.6%	237,094.4	138,216.4
Housing-Unaccompanied	152.5	40.7%	62.0	32.3	13.9%	922,469.6	481,140.6
Industrial	4,332.7	4.9%	210.9	87.6	0.6%	1,150,813.5	477,948.5
Medical	49.0	45.3%	22.2	10.2	3.5%	75,352.9	34,687.9
Open Space		0.0%	0.0	0.0	0.0%	0.0	0.0
Outdoor Recreation	3,677.9	10.0%	367.8	338.5	0.1%	126,069.6	51,463.6
Training	1,571.1	6.4%	101.3	43.0	0.4%	271,069.2	115,107.2
Total	15,919.8		2,011.2	1,102.9		5,216,780.5	2,540,760.5

Summary of Existing Facility Space, Based Upon 7115 Data	
Land-use Category	Total
Administrative	470,206.0
Aircraft Operations and Maintenance	278,329.0
Airfield	21,274.0
Community-Commerical	177,032.0
Community-Service	244,874.0
Housing-Accompanied	98,878.0
Housing-Unaccompanied	441,329.0
Industrial	672,865.0
Medical	40,665.0
Outdoor Recreation	74,606.0
Training	155,962.0
Total	2,676,020.0

Appendix C

Air Emissions Calculations

Appendix C - Air Emission Calculations

Contents:

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C-10	PDA - Emission Increase from POV Emissions

Attachments:

EDMS Model Input and Output Printouts.

Emission Calculations:

Construction/Demolition Equipment Emissions:

Construction EF (lb/1,000 ft²)= Average Construction Equipment Usage Rate (hr/ 1,000 ft²) x Equipment EF (lb/hr)

Where,

EF = emission factor

Pollutant Emissions (lbs) = Construction EF (lb/1,000 ft²) x total square feet of construction or demolition

Fugitive Dust Emissions:

Annual PM10 emissions = 0.11 ton PM10/acre/month x (total acres construction+paving or demolition) x total months of activity

Source: Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from construction.

Paving Equipment Emissions:

Paving EF (lb/1,000 yd³)= Average Paving Equipment Usage Rate (hr/ 1,000 yd³) x Equipment EF (lb/hr)

Where,

EF = emission factor

Pollutant Emissions (lbs) = Paving EF (lb/1,000 yd³) x total ft³ of asphalt/27 ft³/yard/1,000

Evaporative VOC Emissions from Asphalt Paving:

Annual VOC emissions = Area paved (ft²) x depth of paving (ft) x 68.56 lb/ft³ x weight percent of asphalt which evaporates (%)

Where,

depth of paving = 4 inches

68.56 lb/ft³ = density of asphalt

weight percent = 5%

VOC = volatile organic compounds

Note: Above calculation for cutback asphalt. Hot mix asphalt is the predominate type of asphalt used today. Hot mix asphalt emissions are at least an order of magnitude less. Above emissions divided by 10 to reduce by one order of magnitude.

Table C-1
Proposed Action - Summary of Emissions
Tyndall Air Force Base
Bay County, Florida

Year	Total Air Emissions (tpy)					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^a
2009	2.6	18.1	4.3	0.46	12.9	12.9
2010	21.6	111	39.4	4.2	76.2	76.2
2011	1.4	7.0	2.8	0.29	7.4	7.4
2012	40.4	25.8	90.5	9.6	47.3	47.3

CO = carbon monoxide

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Assumed PM_{2.5} = PM₁₀.

Table C-2
Proposed Action - Activities by Year
Tyndall Air Force Base
Bay County, Florida

Project Title	Description	Programmed Year	Building Number	New Construction (ft ²)	Demolition (ft ²)	Paved Area (acres)
Construction	Construct Weapon System Evaluation Program Operation Center. Construct a building to replace Buildings 1275, 1277, and 1279. This building will become the operations center for the air controllers supporting the unmanned drones and the Weapon System Evaluation Program exercises. Expand the existing parking lot, pave the entire area including the semi-circular drive, and layout the parking stalls and traffic aisles to run north and south.	2009		22,500		4.95
Demolition	Headquarters Administrative Offices	2009	444		19,362	0.43
Demolition	Headquarters Administrative Offices	2009	471		5,079	0.13
Demolition	Headquarters Administrative Offices	2009	472		7,210	0.22
Demolition	Tech Training Classroom	2009	535		3,573	0.15
Demolition	Headquarters Administrative Offices	2009	1125		6,936	0.19
Demolition	Headquarters Administrative Offices	2009	1127		2,600	0.070
Demolition	Headquarters Administrative Offices	2009	1129		6,936	0.19
Demolition	Headquarters Administrative Offices	2009	1140		6,936	0.18
Demolition	Cadet Quarters	2009	1532		6,936	0.18
Demolition	Cadet Quarters	2009	1604		6,936	0.18
Demolition	Cadet Quarters	2009	1612		6,936	0.18
Demolition	Sewage Treatment Disposal	2009	1750		4,012	0.09
Construction	120-Person Dormitory Complex. Construct a new dormitory complex to replace Buildings 1150, 1152, and 1154. This project would be Phase 2 of the Dorm Master Plan and located along Suwannee Avenue.	2010		48,000		0.46
Construction	Army Air Force Exchange Service - Service Station. Replace the existing station and shoppette with a new facility that includes a new shoppette, auto parts store, auto service/repair bays, and fuel pumps. The entrance road into this area will be realigned to match entrance between the Burger King and the Commissary.	2010		2,214		0.64
Construction	Combat Arms Training and Maintenance Classroom Facility. Replace the existing Combat Arms Training and Maintenance classroom building with a new facility. The existing Combat Arms Training and Maintenance classroom is a vintage 1950's facility (Building 1265) that does not meet Engineer Technical Letter criteria and is located on the north side of Beacon Beach Road. The new facility will include a classroom, offices for six personnel, a vault, weapons repair and storage, and toilet facilities. The entire facility would be enclosed with chainlike fencing.	2010		8,000		0.16
Construction	Consolidated Airbase Technologies Division Campus. Project is to be comprised of 12 new facilities constructed in a vacant area of the base near the Air Force's Silver Flag training site.	2010		215,439		38.42
Construction	Six Bay Hangar. Project will include a hangar access apron and airfield connecting taxiways. Construct F-22 Consolidated Squadron Operations/Aircraft Maintenance Unit/hangar (new mission) adequately sized, configured, and secure facility providing squadron operations, covered maintenance space and maintenance management space is required to support the beddown of the next generation, air superiority F-22 fighter at Tyndall Air Force Base. Due to the classified mission of the F-22 and the quick burn rate of composite materials, the maintenance facility must have a controlled environment, fire protection, and security provisions. This project supports the delivery of aircraft in FY12 and the standup of the second F-22 training squadron at Tyndall. Antiterrorism forced protection measures will be incorporated.	2010		70,000		0.75
Demolition	Family Support Center	2010	743		5,701	0.18
Demolition	Family Support Center	2010	745		6,936	0.18
Demolition	Headquarters Administrative Offices	2010	822		7,442	0.23
Demolition	Recreation Library	2010	916		11,773	0.31
Demolition	Headquarters Administrative Offices	2010	920		6,936	0.18
Demolition	Army and Air Force Exchange Service - Service Station	2010	968		2,214	0.07
Demolition	Post Office Center	2010	1003		5,614	0.16
Demolition	Recreation Center	2010	1027		18,651	0.49
Demolition	Permanent Party Dormitory	2010	1149		33,682	0.3
Demolition	Permanent Party Dormitory	2010	1150		19,987	0.14
Demolition	Lounge/Dayroom	2010	1151		2,615	0.03
Demolition	Permanent Party Dormitory	2010	1152		10,125	0.12
Demolition	Lounge/Dayroom	2010	1153		3,315	0.05
Demolition	Permanent Party Dormitory	2010	1154		10,125	0.12
Demolition	Lounge/Dayroom	2010	1155		2,615	0.03
Demolition	Technical Training Student Housing	2010	1156		10,125	0.13
Demolition	Combat Arm Training Maintenance Classroom Facility	2010	1265		1,819	0.06
Demolition	Cadet Quarters	2010	1613		3,105	0.08
Demolition	Dormitory Visiting Airman's Quarters	2010	1615		24,111	0.25
Demolition	Storage Shed	2011	419		600	0.02
Demolition	CE Administrative Offices	2011	421		37,897	0.93
Demolition	CE Storage Shed	2011	422		612	0.01
Demolition	CE Storage Shed	2011	425		7,000	0.16
Demolition	CE Storage Shed	2011	449		12,710	0.33
Demolition	CE Storage Shed	2011	450		12,710	0.21
Demolition	CE Hazard Storage/Shed	2011	451		1,482	0.03
Demolition	CE Maintenance Shop	2011	453		3,008	0.08
Demolition	CE Storage Facility	2011	457		1,250	0.04

Table C-2
Proposed Action - Activities by Year
Tyndall Air Force Base
Bay County, Florida

Project Title	Description	Programmed Year	Building Number	New Construction (ft ²)	Demolition (ft ²)	Paved Area (acres)
Demolition	CE Storage Facility	2011	458		1,250	0.04
Demolition	CE Administrative Offices	2011	470		9,648	0.19
Demolition	CE Maintenance Shop	2011	474		4,000	0.11
Demolition	Disaster Preparedness	2011	909		10,636	0.12
Demolition	Cadet Quarters	2011	1016		6,936	0.19
Demolition	CE Storage Shed	2011	1352		6,171	0.14
Demolition	CE Storage Shed	2011	6014		1,317	0.04
Demolition	CE Pavement/Grounds Facility	2011	6016		1,286	0.03
Demolition	CE Maintenance Facility	2011	6022		1,330	0.03
Construction	Algae Bio-Fuel Plant. Construct plant to produce "green" gasoline and/or "green" diesel.	2012		3,000		1.19
Construction	Base Civil Engineering (CE) Complex. Construct a facility to replace and relocate base existing Base CE Complex from flightline area to a location. The new CE complex will be sited in an area located west of the Cleveland Gate, south of Highway 98.	2012		106,000		1.13
Construction	Family Camp. Clear and grub seven acres of land and construct 30 Recreational Vehicle sites. Site to include one concrete parking slab and one slab with integral picnic table and shade. Each site to be provided with water, sewer, cable television, electrical service hook-ups, and area lighting.	2012		304,920		0.87
Construction	Fire Station. Construct fire station to replace existing fire station along flightline. This fire station will support both crews and equipment required to respond to aircraft fires on the airfield and structural fires on base.	2012		34,000		0.67
Construction	Construct Live Ordnance Loading Area bomb build up pad/suspect vehicle parking area near the ammo area. This will include a paved or cement pad (150-foot x 150-foot) with large truck turn-around space and possibly a roof (100-foot x 50-foot). Additionally, the completion of the north road will connect to the road near Horseshoe Lake. This will give ammo personnel a back escape route in the event ammo road is the scene of a mishap and they need to evacuate.	2012		32,452		0.01
Construction	Visitors Quarters Billeting and Conference Center. Construct a consolidated Visitors Quarters billeting/conference center facility located at the intersection of Illinois Avenue and Mississippi Road.	2012		90,000		0.88
Demolition	Fire Station	2012	214		43,104	0.48
Demolition	Navigational Aid Shop	2012	529		224	0.010
Demolition	Air Force Communication Squadron Maintenance Facility	2012	653		6,936	0.18
Demolition	Dormitory	2012	806		6,963	0.18
Demolition	Communication Facility	2012	808		6,963	0.19
Demolition	Dormitory	2012	816		6,963	0.19
Demolition	Cadet Quarters	2012	1013		6,936	0.18
Demolition	Headquarters Administrative Offices	2012	1015		6,936	0.18
Demolition	Cadet Quarters	2012	1530		6,936	0.19
Demolition	Cadet Quarters	2012	1614		6,936	0.18
Demolition	Training Lounge Support Building	2012	1616		1,681	0.050
Demolition	Dorm Visiting Airman's Quarters	2012	1617		24,111	0.25
Demolition	Permanent Party Dormitory	2012	1680		25,960	0.38
Demolition	CE Maintenance Shop	2012	6027		7,728	0.20
Demolition	CE Pavement/Grounds Facility	2012	6030		4,000	0.10
Totals				936,525	545,627	61.1

ft² = square feet

Table C-3
Proposed Action - Emissions from Construction and Demolition
Tyndall Air Force Base
Bay County, Florida

Year 2009		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^a (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^b
New Construction	22,500	1.0	0.16	2.2	0.24	0.14	10.1	1.0	0.16	2.2	0.24	10.3	10.3
Demolition	83,452	0.78	0.15	1.9	0.20	0.13	2.5	0.78	0.15	1.9	0.20	2.7	2.7
TOTAL								1.7	0.31	4.1	0.43	12.9	12.9
Year 2010		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^a (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^b
New Construction	343,653	14.8	2.5	33.8	3.6	2.2	67.9	14.8	2.5	33.8	3.6	70.1	70.1
Demolition	186,891	1.7	0.34	4.3	0.45	0.29	5.7	1.7	0.34	4.3	0.45	6.0	6.0
TOTAL								16.6	2.8	38.0	4.0	76.1	76.1
Year 2011		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^a (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^b
New Construction	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	3.6	3.6
Demolition	119,843	1.1	0.22	2.7	0.29	0.19	3.6	1.1	0.22	2.7	0.29	3.8	3.8
TOTAL								1.1	0.22	2.7	0.29	7.4	7.4
Year 2012		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^a (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^b
New Construction ^c	875,292	37.8	6.3	86.0	9.2	5.6	36.7	37.8	6.3	86.0	9.2	42.3	42.3
Demolition	155,441	1.4	0.28	3.6	0.37	0.24	4.7	1.4	0.28	3.6	0.37	5.0	5.0
TOTAL								39.2	6.6	89.5	9.5	47.3	47.3

CO = carbon monoxide

ft² = square feet

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Emission calculation from the Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from Construction.

Annual PM₁₀ emissions = 0.11 ton PM₁₀/acre/month * (total acres construction+paving or demolition)*12 months

b Assumed PM_{2.5} = PM₁₀.

c Includes clearing and grubbing of seven acres for recreational vehicle area.

Table C-4
Proposed Action - Emissions from Paving Operations^a
Tyndall Air Force Base
Bay County, Florida

Year	Area (ft ²)	Depth (in)	Total Air Emissions ^b (tpy)					
			CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
2009	311,018	4	0.82	17.8	0.22	0.022	0.016	0.016
2010	1,896,602	4	5.0	109	1.4	0.13	0.10	0.10
2011	117,612	4	0.31	6.7	0.085	8.36E-03	6.23E-03	6.23E-03
2012 ^d	334,976	4	1.2	19.2	0.92	0.10	0.065	0.065

CO = carbon monoxide

ft² = square feet

in = inches

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a It was assumed that hot mix asphalt will be used for all paved areas. Approximately 2,660,209 ft² will be paved at a thickness of 4 inches.

b Equipment emissions and evaporative VOC emissions. Fugitive dust emissions from ground preparation are shown in Table D-3.

c Assumed PM_{2.5} = PM₁₀.

d Includes recreational vehicle area (not shown in area square footage): 7 acres of gravel/dirt paving at a depth of 6 inches.

Table C-5
Potential Development Alternative
Summary of Emissions
Tyndall Air Force Base
Bay County, Florida

Year	Total Air Emissions (tpy)					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^a
2009	34.2	454	36.3	3.8	253	253
2010	53.2	547	71.4	7.6	316	316
2011	33.1	443	34.8	3.7	247	247
2012	72.0	461	122	13.0	287	287
2013	33.7	436	37.0	3.9	247	247

CO = carbon monoxide

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Assumed PM_{2.5} = PM₁₀.

Table C-6
PDA - Programmed Activities
Tyndall Air Force Base
Bay County, Florida

Project Title	Description	Building Number	New Construction (ft ²)	Demolition (ft ²)	Paved Area (acres)
Construction	Base Operations Building. Construct building adjacent to new heavy aircraft transient parking ramp. The building should include space for transient alert crew required to generate aircraft operations on the two transient ramps. A storage shed for Materials Handling Equipment is also required.		12,000	0	0.48
Construction	Construct Flight Training Center.		28,000	0	0.45
Construction	Construct 325th Mission Support Group Headquarters. Construct new facility to consolidate maintenance administrative offices for 325th Maintenance Group, 325th Maintenance Operations Squadron, and 325th Maintenance Squadron.		50,000	0	0.45
Construction	Construct 83rd Fighter Weapons Squadron Operations/Aircraft Maintenance Unit to replace multiple old, undersized buildings required to support Weapon System Evaluation Program. This building will provide operations space for pilots of QF-4 aircraft and transient pilots.		26,000	0	1.39
Construction	Construct Base Supply Complex. Construct a facility to support base supply functions (high-bay warehouse, shipping and receiving dock, aircraft parts center, administrative offices, flammable storage building, open storage shed, and open storage yard) just east of Dixie Road.		92,000	0	0.21
Construction	Vehicle Maintenance and Storage Complex. Replace existing vehicle administration, maintenance, and parking facilities. New facility will be sized to support a reduced fleet of Government Operated Vehicles and provide additional land for future development along flightline. This facility will be constructed between Dixie Road and the Air Operation Center facility.		15,000	0	0.63
Construction	Construct Explosive Ordnance Disposal Facilities. Construct a new facility for the explosive ordnance disposal team that includes a building and a storage yard for their equipment. This facility will be located west of the Southeast Air Defense Sector /1 st Air Force complex.		6,000	0	0.75
Construction	Construct Family Support Center. Construct a new Family Support Center that will include the Base Housing Offices, Thrift Shop, and Airman's Attic. These related functions are scattered in three old building constructed during World War II. These functions belong in the Community Center.		19,000	0	0.29
Construction	Construct Operations Building. Construct an Operations Building with simulation laboratories for both live and simulated exercises. This building will replace labs currently located in Buildings 1270, 1282, and 1283. The building will also have spaces suitable for conducting classified briefings and exercises. It will be necessary to relocate multiple utility lines that lay under the site of this building.		30,000	0	0.51
Construction	Construct Security Forces approved secure remote access gate at Camp Eagle gate for transport of drone equipment. (Non Military Construction-Simplified Acquisition of Base Engineering Requirements Project)		4,313	0	0
Renovation	Add/Alter Base Exchange. Expand the current Base Exchange to enlarge the furniture and household appliance sales and warehouse areas, provide a larger Food Court with a video arcade, and relocate the Military Clothing Sales Store, Class VI Store, Laundry/Dry Cleaners, and Branch Post Office. These last four functions are currently located in older, scattered buildings that need to be demolished. The outdoor sales area will be relocated and expanded. It will be necessary to relocate a storm water drain along the east face of the current Base Exchange.		29,000	0	1.48
Demolition	Demolish existing Base Operations Building.	149	0	11,440	0.32
Demolition	Demolish existing Base Supply Complex.	266	0	127,027	3
Demolition	Demolish Buildings 531 and 546.	531 and 546	0	25,153	0.62
Demolition	Vehicle Maintenance and Storage Complex. Demolish existing facilities and complete environmental remediation of existing site.	560, 561, and 562	0	27,497	0.74
Demolition	Demolish Weapon System Evaluation Program Operation Center. Demolish Buildings 1275, 1277, and 1279 to construct new Weapon System Evaluation Program Operation Center.	1275, 1277, and 1279	0	20,318	0.76
Demolition	Demolish Operations Buildings. Demolish Buildings 1282 and 1283.	1282 and 1283	0	6,746	0.25

ft² = square feet

PDA = potential development alternative

Table C-7
PDA - Emissions from Construction^a and Demolition
Tyndall Air Force Base
Bay County, Florida

Year 2009		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^b (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
New Construction	292,431	12.6	2.11	28.7	3.07	1.88	247.8	12.6	2.11	28.7	3.07	249.6	249.6
Demolition	83,452	0.78	0.15	1.9	0.20	0.13	2.53	0.78	0.15	1.9	0.20	2.7	2.7
TOTAL								13.4	2.26	30.6	3.26	252.3	252.3
Year 2010		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^b (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
New Construction	613,584	26.5	4.4	60.3	6.4	4.0	305.5	26.5	4.4	60.3	6.4	309.5	309.5
Demolition	186,891	1.7	0.34	4.3	0.45	0.29	5.7	1.7	0.34	4.3	0.45	6.0	6.0
TOTAL								28.2	4.8	64.5	6.9	315.4	315.4
Year 2011		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^b (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
New Construction	269,931	11.6	1.9	26.5	2.8	1.7	241.2	11.6	1.9	26.5	2.8	243.0	243.0
Demolition	119,843	1.1	0.22	2.7	0.29	0.19	3.6	1.1	0.22	2.7	0.29	3.8	3.8
TOTAL								12.8	2.16	29.3	3.12	246.8	246.8
Year 2012		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^b (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
New Construction ^d	1,145,223	49.4	8.2	112.5	12.0	7.4	274.3	49.4	8.2	112.5	12.0	281.7	281.7
Demolition	155,441	1.4	0.28	3.6	0.37	0.24	4.7	1.4	0.28	3.6	0.37	5.0	5.0
TOTAL								50.9	8.5	116.0	12.4	286.7	286.7
Year 2013		Heavy Equipment Total Emissions (tpy)					Fugative Dust ^b (tpy)	Total Air Emissions (tpy)					
Activity	ft ²	CO	VOC	NO _x	SO _x	PM ₁₀	PM ₁₀	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
New Construction	269,931	11.6	1.9	27	2.8	1.7	238	11.6	1.9	27	2.8	239	239
Demolition ^e	218,181	2.0	0.40	5.0	0.52	0.34	6.6	2.0	0.40	5.0	0.52	7.0	7.0
TOTAL								13.7	2.3	32	3.4	246	246

CO = carbon monoxide

ft² = square feet

NO_x = nitrogen oxides

PDA = potential development alternative

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Total square feet of additional PDA construction shown in Table D-6 (1,349, 654 ft²) is equally divided among the 5 years of the Alternative 2 Action (2009-2013).

b Emission calculation from the Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from Construction.

Annual PM₁₀ emissions = 0.11 ton PM₁₀/acre/month * (total acres construction+paving or demolition)*12 months

c Assumed PM_{2.5} = PM₁₀.

d Includes clearing and grubbing of seven acres for recreational vehicle area.

e Proposed Action activities take place during 2009-2012, total Potential Development Alternative (PDA) demolition takes place during 2013.

Table C-8
PDA - Emissions from Paving Operations^a
Tyndall Air Force Base
Bay County, Florida

Year	Area (ft ²)	Depth (in)	Total Air Emissions ^b (tpy)					
			CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
2009	7,883,576	4	20.83	451.5	5.70	0.560	0.417	0.417
2010	9,469,160	4	25.0	542.3	6.8	0.67	0.501	0.501
2011	7,690,170	4	20.32	440.4	5.56	0.547	0.407	0.407
2012 ^d	7,907,534	4	21.2	453.0	6.40	0.63	0.466	0.466
2013	7,572,558	4	20	434	5.5	0.5	0.4	0.4

CO = carbon monoxide

ft² = square feet

in = inches

NO_x = nitrogen oxides

PDA = potential development alternative

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a It was assumed that 4 inches of hot mix asphalt will be used for all paved areas. Total square feet of additional PDA paving shown in Table D-6 (37,862, 788 ft²) is equally divided among the 5 years of the Alternative 2 Action (2009-2013).

b Equipment emissions and evaporative VOC emissions. Fugitive dust emissions from ground preparation are shown in Table D-7.

c Assumed PM_{2.5} = PM₁₀.

d Includes recreational vehicle area (not shown area square footage): 7 acres of gravel/dirt paving at a depth of 6 inches.

Table C-9
Summary of Calculation Emission Factors
Tyndall Air Force Base
Bay County, Florida

Average Construction Equipment Usage Rates ^a (hours)									Equipment Emission Factors				
Construction Equipment	New Construction		Existing Facilities			Paving Operations			(from AP-42, Volume 2 - Mobile Sources)				
	Single Story (per 1,000 ft ²)	Multi-Story (per 1,000 ft ²)	Single Story (per 1,000 ft ²)	Multi-Story (per 1,000 ft ²)	Demolition (per 1,000 ft ²)	Asphalt (per 1,000 yd ³)	Gravel/Dirt (per 1,000 yd ³)	Concrete (per 1,000 yd ³)	CO (lb/hr)	VOC (lb/hr)	NO _x (lb/hr)	SO _x (lb/hr)	PM ₁₀ (lb/hr)
Backhoe	2.690	2.194	0.666	0.225	-	-	-	-	1.794	0.304	1.260	0.137	0.112
Blower	-	-	-	-	-	16.000	-	-	12.100	0.410	0.320	0.017	0.021
Bulldozer	1.183	1.387	0.372	0.106	-	6.154	6.154	16.000	1.257	0.425	3.840	0.463	0.406
Concrete Truck	7.528	3.764	0.753	0.376	-	-	-	203.262	1.794	0.304	4.166	0.454	0.256
Crane	10.334	15.545	1.894	1.040	3.000	-	-	-	0.675	0.018	1.691	0.143	0.139
Dump Truck	4.228	3.401	0.961	0.239	7.960	10.954	40.129	40.129	1.794	0.304	4.166	0.454	0.256
Front-end Loader	2.680	2.518	0.771	0.184	4.000	-	16.000	16.000	0.572	0.291	1.890	0.182	0.172
Paver	-	-	-	-	-	8.000	-	-	0.675	0.183	1.691	0.143	0.139
Roller	-	-	-	-	-	23.906	23.906	-	0.304	0.083	0.862	0.067	0.050
Scraper	-	-	-	-	-	4.800	-	-	0.151	0.052	0.713	0.086	0.061
Striper	-	-	-	-	-	16.000	-	-	12.100	0.410	0.320	0.017	0.021
18-Wheel Truck	28.080	30.055	5.268	2.484	-	-	-	182.166	1.794	0.304	4.166	0.454	0.256

Construction Equipment Emission Factors								
Pollutant	New Construction		Existing Facilities			Paving Operations		
	Single Story (lb/1,000 ft ²)	Multi-Story (lb/1,000 ft ²)	Single Story (lb/1,000 ft ²)	Multi-Story (lb/1,000 ft ²)	Demolition (lb/1,000 ft ²)	Asphalt (lb/1,000 yd ³)	Gravel/Dirt (lb/1,000 yd ³)	Concrete (lb/1,000 yd ³)
CO	86.288	84.385	15.907	6.907	18.594	427.979	96.146	792.713
VOC	14.400	13.588	2.742	1.129	3.639	22.763	21.455	140.825
NO _x	196.431	194.193	36.013	15.714	45.795	117.062	241.654	1,864.549
SO _x	20.968	20.522	3.844	1.670	4.771	11.515	25.581	203.523
PM ₁₀	12.877	12.931	2.409	1.038	3.143	8.575	16.719	118.190

VOC Emissions from Asphalt Evaporation (AP-42 Section 4.5)	
Density of Asphalt	68.56 lb/ft ³
Weight Percent of Asphalt which Evaporates	5 %

CO = carbon monoxide

ft² = square feet

ft³ = cubic feet

lb/hr =pounds per hour

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

yd³ = cubic yard

a For purposes of analysis, these parameters were estimated using established cost estimating methodologies for construction and experience with similar types of construction projects (Means 1996).

Notes: It has been assumed that hot mix asphalt will be used. VOC evaporative emissions from hot mix asphalt are typically one order of magnitude less than cutback.

Table C-10
PDA - Emission Increase from POV Emissions
Tyndall Air Force Base
Bay County, Florida

Worker Increase	Miles Traveled	Days per Year	Vehicle Miles Traveled (VMT)	Emission Factors ^a (lb/mile)						Total Air Emissions (tpy)					
				CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^b	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^c
5,184	10	345	17,884,800	8.26E-03	8.52E-03	8.45E-04	1.08E-05	8.88E-05	8.88E-05	73.9	76.2	7.6	0.10	0.79	0.79

CO = carbon monoxide

lb/mile = pounds per mile

NO_x = nitrogen oxides

PM_{2.5} = particulate matter equal or less than 2.5 micrometers in diameter

PM₁₀ = particulate matter equal or less than 10 micrometers in diameter

POV = privately owned vehicle

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Source: South Coastal Air Quality Management District. EMFAC 2007 (ver 2.3) On-Road Emission Factors. <http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>

b Assumed PM_{2.5} = PM₁₀.

Appendix C - Attachments
Emissions and Dispersion Modeling System (EDMS) Input and Output Printouts

EDMS 5.1 Model Inputs for 2008 Baseline Study

Study Created: Wed Dec 24 08:16:25 2008
 Report Date: Mon Dec 29 13:11:51 2008
 Study Pathname: K:\Air Force 12832\AETC\eis\Tyndall\edms\2008 Baseline\2008 Baseline.edm

Study Setup

Unit System: English
 Dispersion Modeling: Dispersion is not enabled for this study
 Speciated Hydrocarbon Modeling: Speciated Hydrocarbon Modeling is not enabled for this study
 Analysis Years: 2008

Scenarios

Scenario Name: Baseline	Description: Aircraft Times in Mode Basis: Taxi Time Modeling: FOA3 Sulfur-to-Sulfate Conversion Rate:	Add a description. Performance-Based User-specified Taxi Times 2.400000 %
Scenario Name: PDA	Description: Aircraft Times in Mode Basis: Taxi Time Modeling: FOA3 Sulfur-to-Sulfate Conversion Rate:	Potential Development Alternative Performance-Based User-specified Taxi Times 2.400000 %
Scenario Name: PDA1	Description: Aircraft Times in Mode Basis: Taxi Time Modeling: FOA3 Sulfur-to-Sulfate Conversion Rate:	Add a description. Performance-Based User-specified Taxi Times 2.400000 %
Scenario Name: PDA2	Description: Aircraft Times in Mode Basis: Taxi Time Modeling: FOA3 Sulfur-to-Sulfate Conversion Rate:	Add a description. Performance-Based User-specified Taxi Times 2.400000 %

Airports

Airport Name: Tyndall Afb
 IATA Code: PAM
 ICAO Code: KPAM
 FAA Code:
 Country: US
 State: Florida
 City: Panama City
 Airport Description: Tyndall Afb
 Latitude: 30.070°
 Longitude: -85.576°
 Northing: 3327392.09
 Easting: 637204.53
 UTM Zone: 16
 Elevation: 18.00 feet
 PM Modeling Methodology: FOA3a (Sulfur-to-Sulfate Conversion Rate = 5.0%, Fuel Sulfur Content = 0.068%)

Scenario-Airport: Baseline, Tyndall Afb

Weather

Baseline, Tyndall Afb

Mixing Height: 3000.00 feet
 Temperature: 66.00 °F
 Daily High Temperature: 76.35 °F
 Daily Low Temperature: 55.65 °F
 Pressure: 29.92 inches of Hg
 Sea Level Pressure: 30.06 inches of Hg
 Relative Humidity: 74.21
 Wind Speed: 7.47 knots
 Wind Direction: 0.00 °
 Ceiling: 99999.99 feet
 Visibility: 50.00 miles
 The user has used annual averages.
 Base Elevation: 18.01 feet
 Date Range: Thursday, January 01, 2004 to Friday, December 31, 2004
 Source Data File
 Location:
 Upper Air Data File
 Location:

Quarter-Hourly Operational Profiles

Baseline, Tyndall Afb

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000

3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

Baseline, Tyndall Afb

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

Baseline, Tyndall Afb

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

Baseline, Tyndall Afb

Default Taxi Out Time:	19.000000 min	
Default Taxi In Time:	7.000000 min	
Year:	<u>Uses Schedule?</u>	<u>Schedule Filename:</u>
2008	No	(None)

Aircraft Name:	Take Off weight:	11340.00 Kgs
F-22	Approach Weight:	9525.00 Kgs
Engine Type:	Glide Slope:	3.00°
User-Created	APU Assignment:	None
Identification:	APU Departure OP Time:	13.00 min
#1	APU Arrival OP Time:	13.00 min
Category:	Gate Assignment:	None
LMJA		

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year:	Annual Departures:	16046
2008	Annual Arrivals:	16046
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:	Take Off weight:	11340.00 Kgs
Boeing F-15 Eagle	Approach Weight:	9525.00 Kgs
Engine Type:	Glide Slope:	3.00°
F100-PW-100	APU Assignment:	None
Identification:	APU Departure OP Time:	13.00 min
#3	APU Arrival OP Time:	13.00 min
Category:	Gate Assignment:	None
LMJA		

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year: 2008	Annual Departures:	31483
	Annual Arrivals:	31483
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Boeing F-15E Strike Eagle
Engine Type:
F100-PW-229
Identification:
#4
Category:
LMJA

Take Off weight:	11340.00 Kgs
Approach Weight:	9525.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year: 2008	Annual Departures:	208
	Annual Arrivals:	208
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT

Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 172 Skyhawk
Engine Type:
O-320
Identification:
#2
Category:
SGPP

Take Off weight:	1111.00 Kgs
Approach Weight:	1111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival QP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year:
2008

Annual Departures:	2808
Annual Arrivals:	2808
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Cessna 210 Centurion
Engine Type:
TIO-540-J2B2
Identification:
#1

Take Off weight:	1633.00 Kgs
Approach Weight:	1633.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None

Category: APU Departure OP Time: 13.00 min
 SGPP APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year: 2008

Annual Departures: 52
 Annual Arrivals: 52
 Annual TGOs: 0
 Taxi Out Time: Determined by Sequencing model
 Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
 Departure Daily Operational Profile: DEFAULT
 Departure Monthly Operational Profile: DEFAULT
 Arrival Quarter-Hourly Operational profile: DEFAULT
 Arrival Daily Operational Profile: DEFAULT
 Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name: DeHavilland DHC-8-100
 Engine Type: PW120A
 Identification: #8
 Category: SCTP

Take Off weight: 14061.00 Kgs
 Approach Weight: 13835.00 Kgs
 Glide Slope: 3.00°
 APU Assignment: None
 APU Departure OP Time: 13.00 min
 APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Baggage Tractor (Stewart & Stevenson TUG MA 50)	Gasoline	0.00	18.00	107.00	55.00	
Belt Loader (Stewart & Stevenson TUG 660)	Gasoline	0.00	15.00	107.00	50.00	

Cabin Service Truck (Hi-Way / TUG 660 chasis)	Diesel	0.00	5.00	71.00	53.00
Catering Truck (Hi-Way / TUG 660 chasis)	Diesel	0.00	5.00	71.00	53.00
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00
Lavatory Truck (TLD 1410)	Diesel	0.00	0.00	56.00	25.00
Service Truck (F250 / F350)	Diesel	0.00	8.00	235.00	20.00

Year:
2008

Annual Departures:	246
Annual Arrivals:	246
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Lockheed Martin F-16 Fighting Falcon
Engine Type:
F100-PW-200
Identification:
#7
Category:
SMJA

Take Off weight:	11340.00 Kgs
Approach Weight:	9525.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2008

Annual Departures: 921
Annual Arrivals: 921
Annual TGOs: 0
Taxi Out Time: Determined by Sequencing model
Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
Departure Daily Operational Profile: DEFAULT
Departure Monthly Operational Profile: DEFAULT
Arrival Quarter-Hourly Operational profile: DEFAULT
Arrival Daily Operational Profile: DEFAULT
Arrival Monthly Operational Profile: DEFAULT
Touch & Go Quarter-Hourly Operational profile: DEFAULT
Touch & Go Daily Operational Profile: DEFAULT
Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name:
McDonnell Douglas F-4 Phantom II
Engine Type:
J79-GE-10B
Identification:
#1
Category:
LMJA

Take Off weight: 23587.00 Kgs
Approach Weight: 18144.00 Kgs
Glide Slope: 3.00°
APU Assignment: None
APU Departure OP Time: 13.00 min
APU Arrival OP Time: 13.00 min
Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2008

Annual Departures: 1315
Annual Arrivals: 1315
Annual TGOs: 0
Taxi Out Time: Determined by Sequencing model
Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
Departure Daily Operational Profile: DEFAULT

Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Mitsubishi MU-2
Engine Type:
TPE331-10A
Identification:
#5
Category:
SGTP

Take Off weight:	5670.00 Kgs
Approach Weight:	5021.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00	
Ground Power Unit (TLD)	Gasoline	0.00	40.00	107.00	75.00	

Year:
2008

Annual Departures:	2080
Annual Arrivals:	2080
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population	Baseline, Tyndall Afb
None.	
Parking Facilities	Baseline, Tyndall Afb
None.	
Roadways	Baseline, Tyndall Afb
None.	
Stationary Sources	Baseline, Tyndall Afb
None.	
Training Fires	Baseline, Tyndall Afb
None.	
Gates	Baseline, Tyndall Afb
None.	
Taxiways	Baseline, Tyndall Afb
None.	
Runways	Baseline, Tyndall Afb
None.	
Taxipaths	Baseline, Tyndall Afb
None.	
Configurations	Baseline, Tyndall Afb
None.	
Buildings	Baseline, Tyndall Afb
None.	
Discrete Cartesian Receptors	Baseline, Tyndall Afb
None.	
Discrete Polar Receptors	Baseline, Tyndall Afb
None.	
Cartesian Receptor Networks	Baseline, Tyndall Afb
None.	
Polar Receptor Networks	Baseline, Tyndall Afb
None.	
User-Created Aircraft	Baseline, Tyndall Afb
Aircraft Name: F-22	Size: Designation: Large Military

Engine: Jet
 Usage: Attack
 European Group: Medium Jet
 Number of Engines 2
 Aircraft Flight Profile Boeing F-15E Strike Eagle
 Engine Flight Profile F100-PW-220

The user has used the following sytem emission indices and fuel flow rates

Aircraft Emissions Profile Boeing F-15E Strike Eagle
 Engine Emissions Profile F100-PW-220

The user has NOT edited the following emission factors:

Mode:	Time (mins):	Fuel Flow(Kg/s)	CO (EI)	HC (EI)	NOx (EI)	SOx (EI)	Smoke Number
Startup	0	0	0	0	0	-1	0
Taxi Out	18.5	0.2626	35.3	7.94	4.61	-1	-1
Takeoff	0.4	1.22	0.86	1.79	29.32	-1	-1
Climb Out	0.8	0.727	0.86	2.89	22.18	-1	-1
Approach	3.5	0.4835	1.92	5.12	12.35	-1	-1
Taxi In	11.3	0.2626	35.3	7.94	4.61	-1	-1

User-Created GSE

Baseline, Tyndall Afb

None.

User-Created APU

Baseline, Tyndall Afb

None.

Scenario-Airport: PDA, Tyndall Afb

Weather

PDA, Tyndall Afb

Mixing Height: 3000.00 feet
 Temperature: 66.00 °F
 Daily High Temperature: 76.35 °F
 Daily Low Temperature: 55.65 °F
 Pressure: 29.92 inches of Hg
 Sea Level Pressure: 30.06 inches of Hg
 Relative Humidity: 74.21
 Wind Speed: 7.47 knots

Wind Direction: 0.00 °
 Ceiling: 99999.99 feet
 Visibility: 50.00 miles
 The user has used annual averages.
 Base Elevation: 18.00 feet
 Date Range: Thursday, January 01, 2004 to Friday, December 31, 2004
 Source Data File
 Location:
 Upper Air Data File
 Location:

Quarter-Hourly Operational Profiles

PDA, Tyndall Afb

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

PDA, Tyndall Afb

Name: DEFAULT

Day	Weight	Day	Weight

Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

PDA, Tyndall Afb

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

PDA, Tyndall Afb

Default Taxi Out Time:	19.000000 min	
Default Taxi In Time:	7.000000 min	
<u>Year:</u>	<u>Uses Schedule?</u>	<u>Schedule Filename:</u>
2008	No	(None)

GSE Population

PDA, Tyndall Afb

None.

Parking Facilities

PDA, Tyndall Afb

None.

Roadways

PDA, Tyndall Afb

None.

Stationary Sources

PDA, Tyndall Afb

None.

Training Fires

PDA, Tyndall Afb

None.

Gates

PDA, Tyndall Afb

None.

Taxiways	PDA, Tyndall Afb
None.	
Runways	PDA, Tyndall Afb
None.	
Taxipaths	PDA, Tyndall Afb
None.	
Configurations	PDA, Tyndall Afb
None.	
Buildings	PDA, Tyndall Afb
None.	
Discrete Cartesian Receptors	PDA, Tyndall Afb
None.	
Discrete Polar Receptors	PDA, Tyndall Afb
None.	
Cartesian Receptor Networks	PDA, Tyndall Afb
None.	
Polar Receptor Networks	PDA, Tyndall Afb
None.	
User-Created Aircraft	PDA, Tyndall Afb

Aircraft Name:	Size:	Large
F-22	Designation:	Military
	Engine:	Jet
	Usage:	Attack
	European Group:	Medium Jet
	Number of Engines	2
	Aircraft Flight Profile	Boeing F-15E Strike Eagle
	Engine Flight Profile	F100-PW-220

The user has used the following sytem emission indices and fuel flow rates

Aircraft Emissions Profile	Boeing F-15E Strike Eagle
Engine Emissions Profile	F100-PW-220

The user has NOT edited the following emission factors:

Mode:	Time (mins):	Fuel Flow(Kg/s)	CO (EI)	HC (EI)	NOx (EI)	SOx (EI)	Smoke Number
Startup	0	0	0	0	0	-1	0
Taxi Out	18.5	0.2626	35.3	7.94	4.61	-1	-1

Takeoff	0.4	1.22	0.86	1.79	29.32	-1	-1
Climb Out	0.8	0.727	0.86	2.89	22.18	-1	-1
Approach	3.5	0.4835	1.92	5.12	12.35	-1	-1
Taxi In	11.3	0.2626	35.3	7.94	4.61	-1	-1

User-Created GSE

PDA, Tyndall Afb

None.

User-Created APU

PDA, Tyndall Afb

None.

Scenario-Airport: PDA1, Tyndall Afb

Weather

PDA1, Tyndall Afb

Mixing Height: 3000.00 feet
 Temperature: 66.00 °F
 Daily High Temperature: 76.35 °F
 Daily Low Temperature: 55.65 °F
 Pressure: 29.92 inches of Hg
 Sea Level Pressure: 30.06 inches of Hg
 Relative Humidity: 74.21
 Wind Speed: 7.47 knots
 Wind Direction: 0.00 °
 Ceiling: 99999.99 feet
 Visibility: 50.00 miles
 The user has used annual averages.
 Base Elevation: 18.01 feet
 Date Range: Thursday, January 01, 2004 to Friday, December 31, 2004
 Source Data File
 Location:
 Upper Air Data File
 Location:

Quarter-Hourly Operational Profiles

PDA1, Tyndall Afb

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000

12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

PDA1, Tyndall Afb

Name: DEFAULT

Day	Weight	Oay	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

PDA1, Tyndall Afb

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000

June 1.000000 December 1.000000

Aircraft

PDA1, Tyndall Afb

Default Taxi Out Time: 19.000000 min
 Default Taxi In Time: 7.000000 min
Year: Uses Schedule? Schedule Filename:
 2008 No (None)

Aircraft Name: F-22
 Engine Type: User-Created
 Identification: #1
 Category: LMJA

Take Off weight: 11340.00 Kgs
 Approach Weight: 9525.00 Kgs
 Glide Slope: 3.00°
 APU Assignment: None
 APU Departure OP Time: 13.00 min
 APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year: 2008

Annual Departures: 25673
 Annual Arrivals: 25673
 Annual TGOs: 0
 Taxi Out Time: Determined by Sequencing model
 Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
 Departure Daily Operational Profile: DEFAULT
 Departure Monthly Operational Profile: DEFAULT
 Arrival Quarter-Hourly Operational profile: DEFAULT
 Arrival Daily Operational Profile: DEFAULT
 Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name: Boeing F-15 Eagle
 Engine Type: F100-PW-100

Take Off weight: 11340.00 Kgs
 Approach Weight: 9525.00 Kgs
 Glide Slope: 3.00°

Identification: APU Assignment: None
 #3 APU Departure OP Time: 13.00 min
 Category: APU Arrival OP Time: 13.00 min
 LMJA Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year: Annual Departures: 50373
 2008 Annual Arrivals: 50373
 Annual TGOs: 0
 Taxi Out Time: Determined by Sequencing model
 Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
 Departure Daily Operational Profile: DEFAULT
 Departure Monthly Operational Profile: DEFAULT
 Arrival Quarter-Hourly Operational profile: DEFAULT
 Arrival Daily Operational Profile: DEFAULT
 Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name: Take Off weight: 11340.00 Kgs
 Boeing F-15E Strike Eagle Approach Weight: 9525.00 Kgs
 Engine Type: F100-PW-229 Glide Slope: 3.00°
 Identification: #4 APU Assignment: None
 Category: APU Departure OP Time: 13.00 min
 LMJA APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	

	Other (Generic)	Diesel	0.00	0.00	140.00	50.00
Year: 2008	Annual Departures:	333				
	Annual Arrivals:	333				
	Annual TGOs:	0				
	Taxi Out Time:	Determined by Sequencing model				
	Taxi In Time:	Determined by Sequencing model				
	Departure Quarter-Hourly Operational profile:	DEFAULT				
	Departure Daily Operational Profile:	DEFAULT				
	Departure Monthly Operational Profile:	DEFAULT				
	Arrival Quarter-Hourly Operational profile:	DEFAULT				
	Arrival Daily Operational Profile:	DEFAULT				
	Arrival Monthly Operational Profile:	DEFAULT				
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT				
	Touch & Go Daily Operational Profile:	DEFAULT				
	Touch & Go Monthly Operational Profile:	DEFAULT				
Aircraft Name: Cessna 172 Skyhawk Engine Type: O-320 Identification: #2 Category: SGPP	Take Off weight:	1111.00 Kgs				
	Approach Weight:	1111.00 Kgs				
	Glide Slope:	3.00°				
	APU Assignment:	None				
	APU Departure OP Time:	13.00 min				
	APU Arrival OP Time:	13.00 min				
	Gate Assignment:	None				
	Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%) Manufactured Year
Year: 2008	Annual Departures:	4493				
	Annual Arrivals:	4493				
	Annual TGOs:	0				
	Taxi Out Time:	Determined by Sequencing model				
	Taxi In Time:	Determined by Sequencing model				
	Departure Quarter-Hourly Operational profile:	DEFAULT				
	Departure Daily Operational Profile:	DEFAULT				
	Departure Monthly Operational Profile:	DEFAULT				
	Arrival Quarter-Hourly Operational profile:	DEFAULT				
	Arrival Daily Operational Profile:	DEFAULT				

Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name:
 Cessna 210 Centurion
 Engine Type:
 TIO-540-J2B2
 Identification:
 #1
 Category:
 SGPP

Take Off weight: 1633.00 Kgs
 Approach Weight: 1633.00 Kgs
 Glide Slope: 3.00°
 APU Assignment: None
 APU Departure OP Time: 13.00 min
 APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Qp Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	10.00	175.00	25.00	

Year:
 2008

Annual Departures: 83
 Annual Arrivals: 83
 Annual TGOs: 0
 Taxi Out Time: Determined by Sequencing model
 Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
 Departure Daily Operational Profile: DEFAULT
 Departure Monthly Operational Profile: DEFAULT
 Arrival Quarter-Hourly Operational profile: DEFAULT
 Arrival Daily Operational Profile: DEFAULT
 Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name:
 DeHavilland DHC-8-100
 Engine Type:
 PW120A
 Identification:
 #8

Take Off weight: 14061.00 Kgs
 Approach Weight: 13835.00 Kgs
 Glide Slope: 3.00°
 APU Assignment: None

Category: APU Departure OP Time: 13.00 min
 SCTP APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Baggage Tractor (Stewart & Stevenson TUG MA 50)	Gasoline	0.00	18.00	107.00	55.00	
Belt Loader (Stewart & Stevenson TUG 660)	Gasoline	0.00	15.00	107.00	50.00	
Cabin Service Truck (Hi-Way / TUG 660 chasis)	Diesel	0.00	5.00	71.00	53.00	
Catering Truck (Hi-Way / TUG 660 chasis)	Diesel	0.00	5.00	71.00	53.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00	
Ground Power Unit (TLD, 28 VDC)	Diesel	0.00	40.00	71.00	75.00	
Lavatory Truck (TLD 1410)	Diesel	0.00	0.00	56.00	25.00	
Service Truck (F250 / F350)	Diesel	0.00	8.00	235.00	20.00	

Year: 2008

Annual Departures:	393
Annual Arrivals:	393
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:	Take Off weight:	11340.00 Kgs
Lockheed Martin F-16 Fighting Falcon	Approach Weight:	9525.00 Kgs
Engine Type:	Glide Slope:	3.00°
F100-PW-200		
Identification:		

#7
 Category: SMJA
 APU Assignment: None
 APU Departure OP Time: 13.00 min
 APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year: 2008
 Annual Departures: 1474
 Annual Arrivals: 1474
 Annual TGOs: 0
 Taxi Out Time: Determined by Sequencing model
 Taxi In Time: Determined by Sequencing model

Departure Quarter-Hourly Operational profile: DEFAULT
 Departure Daily Operational Profile: DEFAULT
 Departure Monthly Operational Profile: DEFAULT
 Arrival Quarter-Hourly Operational profile: DEFAULT
 Arrival Daily Operational Profile: DEFAULT
 Arrival Monthly Operational Profile: DEFAULT
 Touch & Go Quarter-Hourly Operational profile: DEFAULT
 Touch & Go Daily Operational Profile: DEFAULT
 Touch & Go Monthly Operational Profile: DEFAULT

Aircraft Name: McDonnell Douglas F-4 Phantom II
 Engine Type: J79-GE-10B
 Identification: #1
 Category: LMJA
 Take Off weight: 23587.00 Kgs
 Approach Weight: 18144.00 Kgs
 Glide Slope: 3.00°
 APU Assignment: None
 APU Departure OP Time: 13.00 min
 APU Arrival OP Time: 13.00 min
 Gate Assignment: None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	

Other (Generic)	Diesel	0.00	0.00	140.00	50.00

Year:
2008

Annual Departures:	2104
Annual Arrivals:	2104
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Mitsubishi MU-2
Engine Type:
TPE331-10A
Identification:
#5
Category:
SGTP

Take Off weight:	5670.00 Kgs
Approach Weight:	5021.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Aircraft Tractor (Stewart & Stevenson TUG MC)	Diesel	0.00	5.00	86.00	80.00	
Fuel Truck (F750, Dukes Transportation Services, DART 3000 to 6000 gallon)	Diesel	0.00	20.00	175.00	25.00	
Ground Power Unit (TLD)	Gasoline	0.00	40.00	107.00	75.00	

Year:
2008

Annual Departures:	3328
Annual Arrivals:	3328
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population	PDA1, Tyndall Afb
None.	
Parking Facilities	PDA1, Tyndall Afb
None.	
Roadways	PDA1, Tyndall Afb
None.	
Stationary Sources	PDA1, Tyndall Afb
None.	
Training Fires	PDA1, Tyndall Afb
None.	
Gates	PDA1, Tyndall Afb
None.	
Taxiways	PDA1, Tyndall Afb
None.	
Runways	PDA1, Tyndall Afb
None.	
Taxipaths	PDA1, Tyndall Afb
None.	
Configurations	PDA1, Tyndall Afb
None.	
Buildings	PDA1, Tyndall Afb
None.	
Discrete Cartesian Receptors	PDA1, Tyndall Afb
None.	

Discrete Polar Receptors	PDA1, Tyndall Afb

None.

Cartesian Receptor Networks	PDA1, Tyndall Afb

None.

Polar Receptor Networks	PDA1, Tyndall Afb

None.

User-Created Aircraft	PDA1, Tyndall Afb

Aircraft Name: F-22	Size: Large
	Designation: Military
	Engine: Jet
	Usage: Attack
	European Group: Medium Jet
	Number of Engines 2
	Aircraft Flight Profile Boeing F-15E Strike Eagle
	Engine Flight Profile F100-PW-220

The user has used the following sytem emission indices and fuel flow rates

Aircraft Emissions Profile Boeing F-15E Strike Eagle

Engine Emissions Profile F100-PW-220

The user has NOT edited the following emission factors:

Mode:	Time (mins):	Fuel Flow(Kg/s)	CO (EI)	HC (EI)	NOx (EI)	SOx (EI)	Smoke Number
Startup	0	0	0	0	0	-1	0
Taxi Out	18.5	0.2626	35.3	7.94	4.61	-1	-1
Takeoff	0.4	1.22	0.86	1.79	29.32	-1	-1
Climb Out	0.8	0.727	0.86	2.89	22.18	-1	-1
Approach	3.5	0.4835	1.92	5.12	12.35	-1	-1
Taxi In	11.3	0.2626	35.3	7.94	4.61	-1	-1

User-Created GSE	PDA1, Tyndall Afb

None.

User-Created APU	PDA1, Tyndall Afb

None.

Scenario-Airport: PDA2, Tyndall Afb

Weather

PDA2, Tyndall Afb

Mixing Height: 3000.00 feet
 Temperature: 66.00 °F
 Daily High Temperature: 76.35 °F
 Daily Low Temperature: 55.65 °F
 Pressure: 29.92 inches of Hg
 Sea Level Pressure: 30.06 inches of Hg
 Relative Humidity: 74.21
 Wind Speed: 7.47 knots
 Wind Direction: 0.00 °
 Ceiling: 99999.99 feet
 Visibility: 50.00 miles
 The user has used annual averages.
 Base Elevation: 18.00 feet
 Date Range: Thursday, January 01, 2004 to Friday, December 31, 2004
 Source Data File
 Location:
 Upper Air Data File
 Location:

Quarter-Hourly Operational Profiles

PDA2, Tyndall Afb

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000

4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

PDA2, Tyndall Afb

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

PDA2, Tyndall Afb

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

PDA2, Tyndall Afb

Default Taxi Out Time:	19.000000 min	
Default Taxi In Time:	7.000000 min	
<u>Year:</u>	<u>Uses Schedule?</u>	<u>Schedule Filename:</u>
2008	No	(None)

GSE Population

PDA2, Tyndall Afb

None.

Parking Facilities

PDA2, Tyndall Afb

None.		
Roadways		PDA2, Tyndall Afb
None.		
Stationary Sources		PDA2, Tyndall Afb
None.		
Training Fires		PDA2, Tyndall Afb
None.		
Gates		PDA2, Tyndall Afb
None.		
Taxiways		PDA2, Tyndall Afb
None.		
Runways		PDA2, Tyndall Afb
None.		
Taxipaths		PDA2, Tyndall Afb
None.		
Configurations		PDA2, Tyndall Afb
None.		
Buildings		PDA2, Tyndall Afb
None.		
Discrete Cartesian Receptors		PDA2, Tyndall Afb
None.		
Discrete Polar Receptors		PDA2, Tyndall Afb
None.		
Cartesian Receptor Networks		PDA2, Tyndall Afb
None.		
Polar Receptor Networks		PDA2, Tyndall Afb
None.		
User-Created Aircraft		PDA2, Tyndall Afb
Aircraft Name: F-22	Size: Designation: Engine: Usage: European Group: Number of Engines	Large Military Jet Attack Medium Jet 2

Aircraft Flight Profile Boeing F-15E Strike Eagle
 Engine Flight Profile F100-PW-220

The user has used the following sytem emission indices and fuel flow rates

Aircraft Emissions Profile Boeing F-15E Strike Eagle
 Engine Emissions Profile F100-PW-220

The user has NOT edited the following emission factors:

Mode:	Time (mins):	Fuel Flow(Kg/s)	CO (EI)	HC (EI)	NOx (EI)	SOx (EI)	Smoke Number
Startup	0	0	0	0	0	-1	0
Taxi Out	18.5	0.2626	35.3	7.94	4.61	-1	-1
Takeoff	0.4	1.22	0.86	1.79	29.32	-1	-1
Climb Out	0.8	0.727	0.86	2.89	22.18	-1	-1
Approach	3.5	0.4835	1.92	5.12	12.35	-1	-1
Taxi In	11.3	0.2626	35.3	7.94	4.61	-1	-1

User-Created GSE

PDA2, Tyndall Afb

None.

User-Created APU

PDA2, Tyndall Afb

None.

EDMS 5.1 Emissions Inventory Report
Emissions Inventory Summary
Study: 2008 Baseline
Scenario - Airport: Baseline - Tyndall Afb
Year: 2008
Units: Short Tons per Year
Generated: 12/29/08 12:46:09

Category; CO2; CO; THC; NMHC; VOC; TOG; NOx; SOx; PM-10; PM-2.5;
Aircraft; 145806.957; 1363.659; 338.682; 391.461; 389.404; 391.512; 417.807; 59.709; 0.000; 0.000;
GSE; N/A; 28.952; N/A; 5.121; 5.468; 5.596; 62.961; 1.181; 3.490; 3.384;
APUs; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Parking Facilities; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Roadways; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Stationary Sources; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Training Fires; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Grand Total; 145806.957; 1392.612; 338.682; 396.582; 394.871; 397.108; 480.768; 60.890; 3.490; 3.384;

EDMS 5.1 Emissions Inventory Report
Emissions Inventory Summary
Study: 2008 Baseline
Scenario - Airport: PDA1 - Tyndall Afb
Year: 2008
Units: Short Tons per Year
Generated: 12/29/08 13:03:39

Category; CO2; CO; THC; NMHC; VOC; TOG; NOx; SOx; PM-10; PM-2.5;
Aircraft; 233289.901; 2181.834; 541.888; 626.333; 623.042; 626.415; 668.491; 95.534; 0.000; 0.000;
GSE; N/A; 46.322; N/A; 8.194; 8.748; 8.954; 100.738; 1.889; 5.583; 5.415;
APUs; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Parking Facilities; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Roadways; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Stationary Sources; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Training Fires; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Grand Total; 233289.901; 2228.156; 541.888; 634.527; 631.790; 635.369; 769.229; 97.424; 5.583; 5.415;

(no document text this page)