HEADQUARTERS 45TH SPACE WING
PATRICK AIR FORCE BASE, FLORIDA

FINAL DRAFT
ENVIRONMENTAL ASSESSMENT
FOR
OUTDOOR RECREATION BEACH COTTAGES ON PATRICK AIR FORCE BASE, FLORIDA

October 2019

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
APE	Area of Potential Effect
APIMS	Air Program Information Management System
BA	Biological Assessment
bls	Below Land Surface
BO	Biological Opinion
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management System
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact

155	FWC	Florida Fish and Wildlife Conservation Commission
156	FY	Fiscal Year
157	GHG	Greenhouse Gas
158	GIS	Geographic Information System
159	HABS	Historic American Buildings Survey
160	HAP	Hazardous Air Pollutant
161	HFC	Hydrofluorocarbon
162	ICRMP	Integrated Cultural Resources Management Plan
163	INRMP	Integrated Natural Resources Management Plan
164	LOS	Level of Service
165	MBTA	Migratory Bird Treaty Act
166	mg/L	milligrams per liter
167	MWR	Morale, Welfare, and Recreation
168	N_2O	Nitrous Oxide
169	NAAQS	National Ambient Air Quality Standards
170	NEI	National Emissions Inventory
171	NEPA	National Environmental Policy Act
172	NF_3	Nitrogen Trifluoride
173	NHPA	National Historic Preservation Act
174	NOA	Notice of Availability
175	NOAA	National Oceanic and Atmospheric Administration
176	NO_X	Nitrogen Oxide
177	NRHP	National Register of Historic Places
178	NWI	National Wetlands Inventory
179	O_3	Ozone
180	OSHA	Occupational Safety and Health Administration
181	PFC	Perfluorocarbon
182	PM2.5	Particulate Matter – Fine
183	PM10	Particulate Matter – Respirable
184	ppb	parts per billion
185	PPE	Personal Protective Equipment
186	ppm	parts per million
187	ROI	Region of Influence
188	SF	Sulfur Hexafluoride

SHPO	State Historic Preservation Officer
SJRWMD	St. Johns River Water Management District
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
TDML	Total Daily Maximum Loads
TDS	Total Dissolved Solids
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WMD	Water Management Districts

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1. PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The U.S. Air Force (USAF) proposes to construct six new 1,400 square foot outdoor recreation beach lodging units on Patrick Air Force Base (AFB), Florida. The beach cottages would be sited east of State Road (SR) A1A near the northern end of the base, immediately south of three existing recreation lodges. This Environmental Assessment (EA) was prepared to evaluate the potential environmental impacts of this proposed project in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), the USAF Environmental Impact Analysis Process (EIAP) Regulations at 32 CFR Part 989, and Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*.

Patrick AFB is located on a barrier island on the east-central coast of Florida, south of the city of Cocoa Beach. The base covers approximately 1,937 acres bounded by the Atlantic Ocean on the east and the Banana River to the west (Figure 1). There is little topographic relief across Patrick AFB, with elevations from 0 to 6.1 meters above mean sea level; the highest elevation is located on sand dunes along the Atlantic Ocean.

The information presented in this EA will serve as the basis for deciding whether the Proposed Action would result in a significant impact to the human environment, requiring the preparation of an environmental impact statement (EIS), or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate. If the Proposed Actions would impact the 100-year floodplain a Finding of No Practicable Alternative (FONPA) would be prepared in conjunction with the FONSI as required by Executive Order (EO) 11988, *Floodplain Management*.

1.2 Purpose of the Action

The purpose of the Proposed Action is to provide adequate beachfront recreation to help fulfill the 45 Force Support Squadron (FSS) mission to promote readiness for worldwide warfighting missions by providing superior military/civilian support, leisure/recreation, youth services, lodging, food service, education counseling/enlisted professional military education.

1.3 Need for the Action

The Proposed Action is needed because the three existing beach cottages cannot satisfy Morale, Welfare, and Recreation (MWR) requests on Patrick AFB. The popularity of the beach cottages has resulted in an average of 14 customers per week being turned away over the past two years due to the current facilities being occupied. The proposed units are required to address this unmet demand. Additionally, the existing beach cottages produce a revenue stream that the 45 FSS is able to use to directly support Airmen and their families in other FSS mission-directed activities. The addition of additional units would expand this revenue stream.

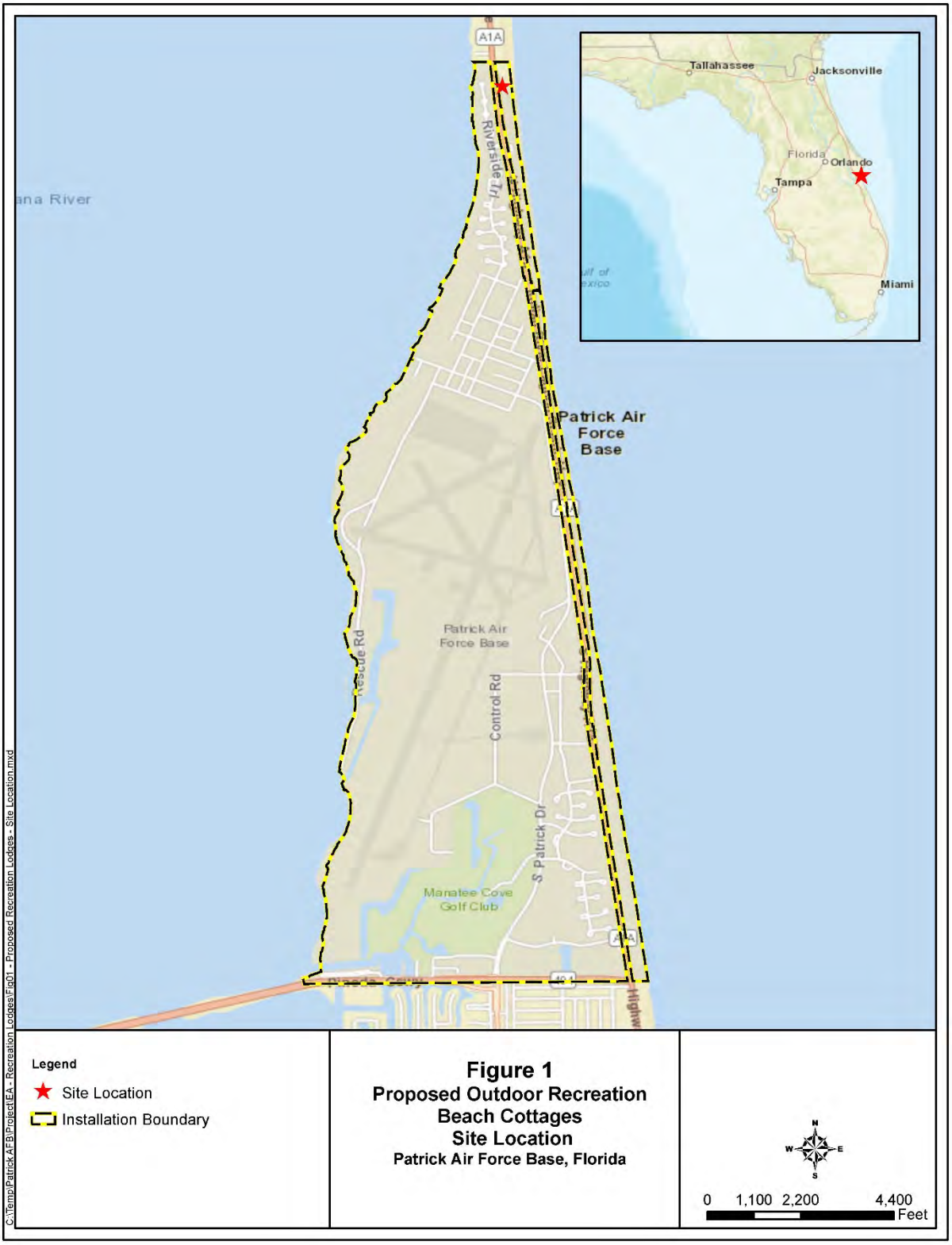

Figure 1. Location of Patrick AFB and Proposed Action Area

1.4 Interagency/Intergovernmental Coordination and Consultations

Per the requirements of the Intergovernmental Cooperation Act of 1968 (31 USC 6501 et seq.) and EO 12372, *Intergovernmental Review of Federal Programs*, federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action will be notified during the development of this EA.

The USAF has provided this Draft EA to the U.S. Fish and Wildlife Service (USFWS), the State Office of Historic Preservation (SHPO) (the USAF also provided the SHPO a Phase I Cultural Resources Assessment Survey report for the three existing cottages and the Proposed Action site), and the Florida State Clearinghouse (correspondence is included in Appendix A). The Clearinghouse routes applications for Federal activities, such as EAs, to the appropriate state, regional, and local reviewers for them to provide comments and recommendations to the Clearinghouse based on their statutory authorities.

The USAF would coordinate with the Florida Department of Transportation (FDOT) prior to construction if the Proposed Action is implemented. However, a permit would not be required because the Proposed Action would utilize existing driveways.

The Federal Coastal Zone Management Act (CZMA) (16 USC §1451 et seq.), creates a state-federal partnership to ensure the protection of coastal resources. The Federal CZMA requires each federal agency activity within or outside the coastal zone, which affects any land or water use or natural resources of the coastal zone to be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of the applicable State Coastal Management Program. The geography of Florida and the CZMA dictate that the entire state of Florida be designated as a Coastal Zone and be subject to the Florida Coastal Management Program (FCMP), codified as Chapter 380, Part II, Florida Statutes (F.S.). The FCMP consists of a network of 24 Florida Statutes administered by eight state agencies and five Water Management Districts (WMDs). The USAF CZMA consistency statement is provided in Appendix B. The Proposed Action would be reviewed to determine consistency with the FCMP as part of the Environmental Resource Permit (ERP) process. The determination process was initiated with the submission of the Draft EA to the Florida State Clearinghouse. The Florida State Clearinghouse concurred with the Air Force's consistency determination in a letter dated 07 October 2019

Consistent with DoD Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, and AFI 90-2002, *Air Force Interaction with Federally-recognized Tribes*, federally-recognized tribes that are historically affiliated with the Patrick AFB geographic region are invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Patrick AFB point-of-contact for Native American tribes is the 45th SW Cultural Resources Manager.

A Phase I archaeological survey was conducted on the Proposed Action site. Background research determined there was no potential for prehistoric Native American cultural remains anywhere within or adjacent to the project area or Patrick AFB. Cultural resources on the base tend to be historic (World War II era or later) in nature. There are also no Traditional Cultural Properties within or adjacent to the project area.

The three federally recognized tribes have stated they are only interested in proposed undertakings that involve Native American sites or cultural remains.

1.5 Public and Agency Review of the EA

Because the Proposed Action area coincides with the 100-year floodplain, it is subject to the requirements and objectives of EO 11988, *Floodplain Management*. The USAF published an early notice that the Proposed Action would occur in a floodplain in the Florida Today newspaper on 27 December 2018. The notice solicited public comment on the Proposed Action. The comment period for public and agency input ended on 25 January 2019. No comments were received.

A Notice of Availability (NOA) announcing the availability of the Draft EA and FONSI/FONPA for review was published in the Florida Today newspaper on TBD. The NOA invited the public to review and comment on the Draft EA. Copies of the Draft EA and FONSI/FONPA were made available for review at the Cocoa Beach Public Library, located at 550 North Brevard Avenue, Cocoa Beach, Florida; and were posted on the Patrick AFB website, www.patrick.af.mil, Copies of the Draft EA and FONSI/FONPA were distributed to the agencies identified in Section 1.4. The public and agency review period ended on TBD. The NOA and public and agency comments are provided in Appendix A-4.

1.6 Decision to be Made

The EA evaluates whether the Proposed Action would result in significant impacts on the human environment. If significant impacts are identified, Patrick AFB would undertake mitigation to reduce impacts to below the level of significance, undertake the preparation of an EIS addressing the Proposed Action, or abandon the Proposed Action.

This EA is a planning and decision-making tool that will be used to guide Patrick AFB in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship.

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Patrick AFB proposes to expand the existing beachside lodging by constructing six outdoor recreation lodging units immediately south of the three existing units located east of SR A1A near the north end of the base. The Proposed Action would satisfy the "Purpose of" and "Need for" the Action described in Sections 1.2 and 1.3.

The six units would be constructed as three duplexes. The structures would be elevated on concrete piers, and would comply with current floodplain construction codes and standards. Each duplex would consist of two 1,350 square foot two-bedroom, two-bath rental units including a kitchen, living/dining room, laundry room, outdoor deck, private beach access, and private parking for each unit. A conceptual rendering is provided in Figure 2.

The Proposed Action would include the following components:

- Construction of the six units;
- Construction of two shared boardwalks to the beach (these would be elevated to minimize impacts to the foredunes);
- Construction of a common asphalt drive and unit-specific parking areas (18 spaces);
- Construction of a stabilized turf emergency vehicle turnaround at the south end of the drive;
- Construction of concrete sidewalks, foundations/building pads, and patios;
- Excavation/construction of stormwater retention ponds that would tie-in to the existing system; and
- Connection to utilities (water, sewer [this would require a lift station at the north end of the site], electrical, and communications) located adjacent to the site.

The limits of disturbance would primarily be on improved (i.e., paved or regularly mowed) vacant land with few scattered trees. Some vegetation adjacent to and on the foredunes would be removed for construction of patios and boardwalks. Dune vegetation removal would be minimized to the extent practicable. Limited grading would be required on the backside of the dunes to stabilize them.

Construction would begin in 2019 and would require 7 to 10 months to complete. Required equipment would include a dozer, grader, excavator, asphalt paving equipment, concrete mixer truck, heavy trucks, vibratory equipment, and hand tools.

Site preparation activities would include the following:

- Removal of surface vegetation and root mats from the proposed building areas and adjoining drives and decks, extending 10 feet beyond foundation lines;
- Excavation of proposed utility line routes;
- Compaction of prepared surfaces;
- Installation of auger cast piles to a depth of approximately 15 feet below the erosion profile to support the structures;
- Filling to final grade under structures with approved fill soils; and

- Densification of surficial sands in all parking and drive areas with heavy equipment (e.g., a fully loaded tandem truck or vibratory equipment).

2.2 Selection Standards

The NEPA, CEQ regulations, and 32 CFR Part 989 require an EA to evaluate reasonable alternatives to the Proposed Action. Alternatives that are eliminated from detailed analysis must be identified along with a brief discussion of the reasons for eliminating them. For purposes of analysis, an alternative is considered "reasonable" only if it enables Patrick AFB to satisfy MWR requirements. "Unreasonable" alternatives would not enable Patrick AFB to meet the purpose of and need for the Proposed Action and therefore would not be retained for further analysis.

NEPA and the CEQ regulations mandate the consideration of reasonable alternatives for the Proposed Action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the Proposed Action. Per the requirements of 32 CFR Part 989, the USAF EIAP regulations, selection standards are used to identify alternatives for meeting the purpose of and need for the Proposed Action.

In addition to supporting the "Purpose of" and "Need for" the Action, the Proposed Action must meet the following baseline requirements:

- Be compatible with the existing, ongoing military mission and activities on Patrick AFB and other DoD installations in the area.
- Be compatible with and near existing infrastructure and development on Patrick AFB.

The USAF developed the following selection standards to determine whether an alternative would be reasonable:

1. The alternative must minimize impacts to dune structure and vegetation.
2. The alternative must include an interior and exterior lighting design that complies with 45th SW USFWS Biological Opinion for light management (FWS log 41910-2009-F-0087) and 45th SW Instruction 32-7001 *Exterior Lighting Management* (23 April 2018).
3. The alternative must provide additional beachside MWR capacity adjacent to the current beach cottages.
4. The alternative must not result in additional ingress/egress points onto SR A1A.

2.3 Screening of the Alternatives

The following potential alternatives that might meet the purpose and need were considered:

- **Alternative 1 (Preferred):** Single Connection to SR A1A.
- **Alternative 2:** Dual Connection to SR A1A.
- **Alternative 3:** No Action (this alternative would not satisfy the purpose and need but must be considered to provide a baseline comparison to the action alternatives).

The selection standards described in Section 2.2 were applied to these alternatives in **Table 1** to determine which alternative(s) could satisfy the purpose and need for the action.

373 Figure 2. Proposed Recreation Cottages Schematic

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As shown on **Table 1**, Alternatives 1 and 2 satisfy all three Selection Standards. Alternative 3 does not satisfy Selection Standard 3.

Table 1. Screening of the Alternatives.

Alternative Descriptions	Selection Standards			
	1. Minimal Impacts to Dunes	2. Compliant with 45th SW Instruction 32-7001	3. Provide Additional Beachside MWR Capacity Adjacent to Existing Beach Cottages	4. No additional ingress/egress to SR A1A
Alternative 1 (Preferred Alternative): Single Connection to SR A1A	**Yes**	**Yes**	**Yes**	**Yes**
Alternative 2: Dual Connection to SR A1A	**Yes**	**Yes**	**Yes**	**Yes**
Alternative 3: No Action	**Yes**	**Yes**	**No**	**Yes**

2.4 Description of the Alternatives

Alternatives 1 and 2 both include all components of the Proposed Action described in Section 2.1 and are located south of and adjacent to the existing beach cottages. Differences in the areal footprints of the two alternatives are described in Sections 2.4.1 and 2.4.2 and **Table 2**. Because Alternatives 1 and 2 both equally satisfied the screening criteria, the USAF has not selected a Preferred Alternative at this time.

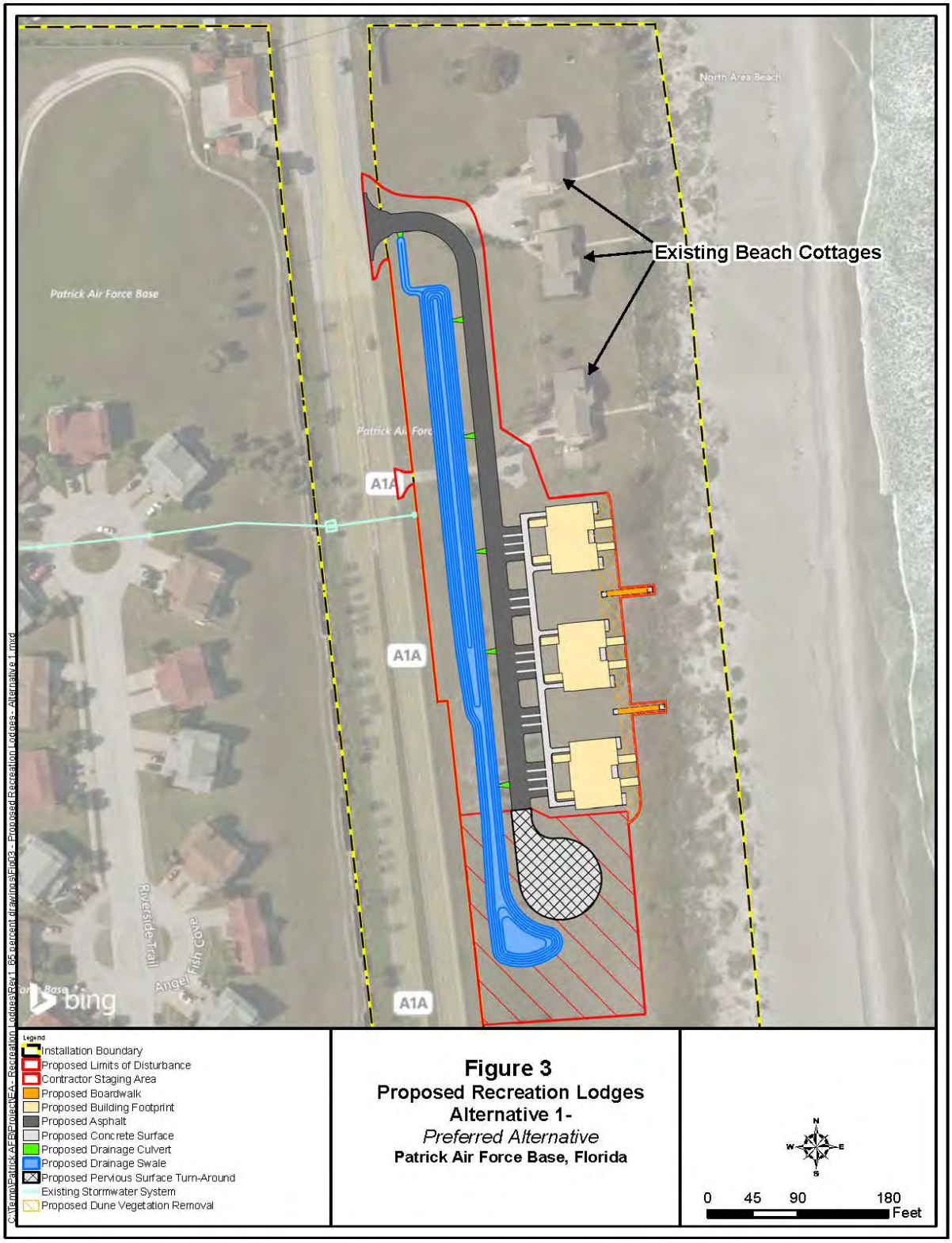
2.4.1 Alternative 1 — Single Connection to SR A1A (Preferred Alternative)

Alternative 1 (the Preferred Alternative) would extend the common driveway north to include access to the three existing beach cottages (Figure 3). This alternative would require the removal of portions of the southern existing concrete driveway. The maximum limits of disturbance for this alternative would be approximately 2.9 acres. A comparison of aboveground structures included in the two action alternatives is included in **Table 2**.

Table 2. Comparison of the Action Alternatives.

Features	Area in Square feet (Acres)	
	Alternative 1	Alternative 2
Building Footprint	10,500 (0.24)	10,500 (0.24)
Asphalt Drive	**16,500 (0.38)**	11,400 (0.26)
Demolition/Removal of Existing Concrete	**2,360 (0.054)**	1,250 (0.029)
Concrete Walkways, Patios and Drives	**5,040 (0.12)**	5,030 (0.12)
Stormwater Basin	**20,050 (0.46)**	15,250 (0.35)
Pervious Emergency Turnaround	6,500 (0.15)	6,500 (0.15)
Boardwalk	330 (0.008)	330 (0.008)
Limits of Disturbance	**125,888 (2.89)**	114,998 (2.64)

Note: where not equal, the larger feature area is in **bold** font.



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394 Figure 3. Proposed Recreation Lodges – Alternative 1 (Preferred Alternative)

2.4.2 Alternative 2 — Dual Connection to SR A1A

Alternative 2 would extend the common driveway north to include access to the southern beach cottage (Figure 4). The existing drive to the southern beach cottage would be repaired and incorporated into the new common driveway. The two northern cottages would retain their current shared driveway. The maximum limits of disturbance for this alternative would be approximately 2.7 acres.

2.4.3 Alternative 3 — No-Action

Under Alternative 3 (No Action), the USAF would not construct the proposed Outdoor Recreation Beach Cottages but would continue to maintain and rent the three existing beach cottages.

2.5 Alternatives Eliminated from Further Consideration

Developable beachfront land that would satisfy the Purpose and need of the Proposed Action and the selection standards is very uncommon on Patrick AFB. The USAF was not able to identify other potential locations on Patrick AFB because of limitations related to clear zones and existing development, the fact that maintenance and cleaning functions would not be practicable at a location not adjacent to the existing beach cottages, and the fact that no sites were identified that would satisfy selection standard 4 (i.e., the site could accommodate the beach cottages without the construction of additional ingress/egress points on SR A1A). The USAF did initially consider an alternative similar to Alternative 2, but with an additional southern driveway instead of the proposed emergency vehicle turn-around. This alternative was eliminated from consideration because there is no median break in SR A1A in this area, so the drive could only be entered via the northbound lane and exiting vehicles would only be able to complete a right-hand turn. Additionally, while this alternative would satisfy selection standards 1, 2, and 3; it would not satisfy selection standard 4.

2.6 Summary of Anticipated Environmental Impacts

Table 3 provides a brief summary of the anticipated impacts to resource areas that would result if the USAF implements either of the action alternatives or the No Action Alternative. Impacts would not be expected to approach the significance threshold for any resource areas.

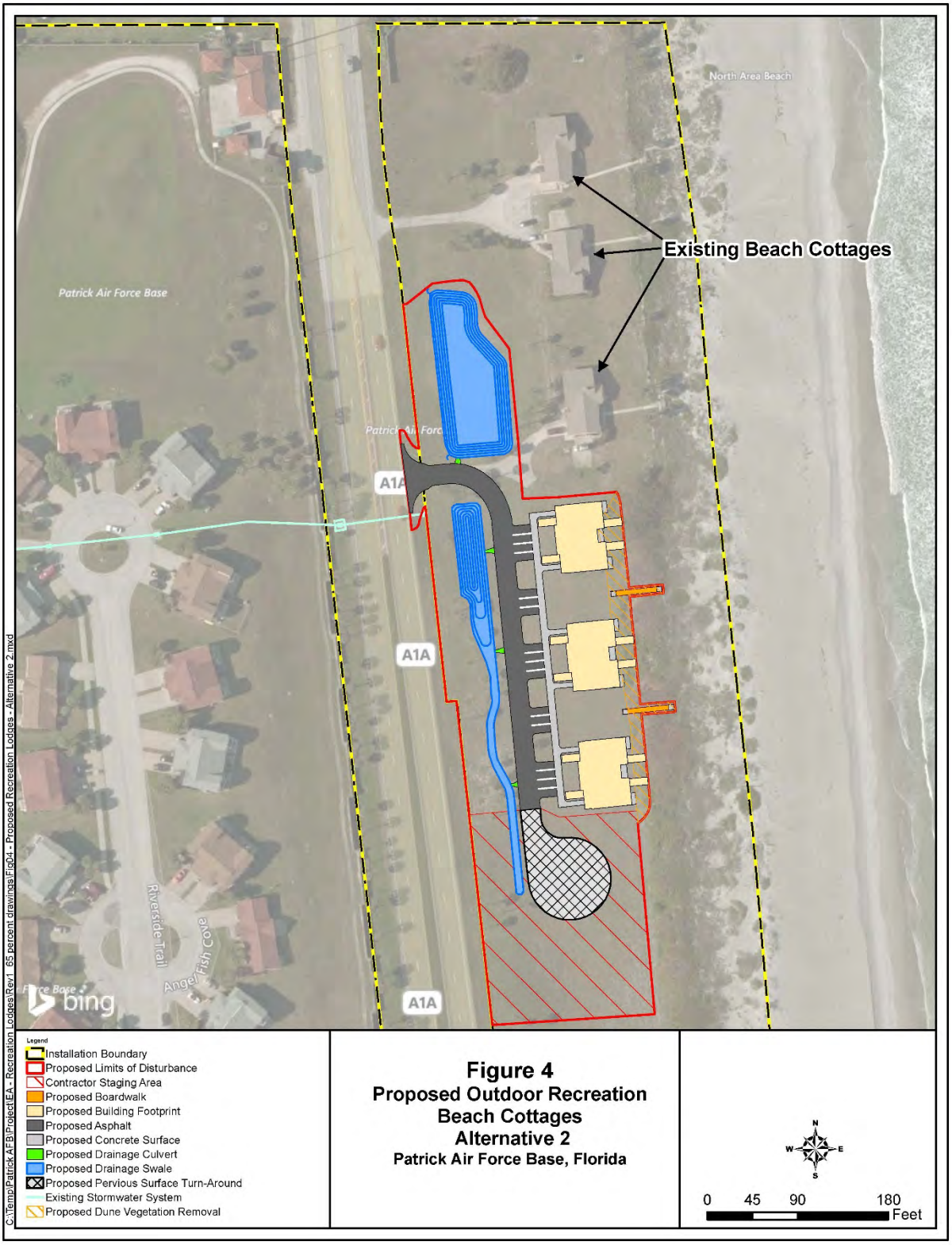

Figure 4. Proposed Recreation Lodges – Alternative 2

422 Table 3. Summary of Environmental Impacts.

Resource	Alternative 1 – Single Connection to SR A1A	Alternative 2 – Dual Connection to SR A1A	Alternative 3 – No Action
Airspace	No impact.	Same as Alternative 1.	No impact.
Noise / Acoustic Environment	Negligible localized, short-term impact during installation.	Same as Alternative 1.	No impact.
Air Quality and Climate Change	Negligible short-term impact due to increase vehicle emissions and fugitive dust during construction.	Same as Alternative 1.	No impact.
Water Resources	Insignificant floodplain impact related to storm waves. Buildings would be elevated and stormwater retention ponds would provide some compensatory storage.	Same as Alternative 1.	Insignificant floodplain impact related to storm waves.
Biological / Natural Resources	Insignificant impact. A light management plan would be approved in consultation with USFWS and implemented to prevent jeopardy to the continued existence of federally listed sea turtles. Any incidental take would be within the limits allowed by the current 45 SW Biological Opinion (BO), and the 45 SW will continue to monitor/regulate base lighting to reduce potential take.	Same as Alternative 1.	Insignificant impact. Current lighting complies with the 45 SW BO.
Earth Resources	Insignificant impact. Alternative 1 does not include significant alteration to geologic resources.	Same as Alternative 1.	No impact.
Hazardous Materials / Waste	Insignificant impact. A small amount of concrete and excess soil would be removed to an offsite landfill during construction. Negligible increase in solid waste due to increased occupancy.	Same as Alternative 1.	No impact.
Cultural Resources	No impact anticipated. Standard Operating Procedures (SOPs) would be in place in the event of unanticipated cultural resource discoveries.	Same as Alternative 1.	No impact.
Land Use	No impact. Proposed site categorized as *Accompanied Housing with Open Space*, which would be compatible with alternative 1.	Same as Alternative 1.	No impact.
Infrastructure / Utilities	Negligible impact. Patrick AFB has adequate capacity for electrical, potable water, and wastewater. Stormwater would be attenuated onsite and tied into existing system.	Same as Alternative 1.	Negligible impact due to continued beach rentals.
Safety and Occupational Health	Insignificant impact. Contractor would be required to take measures to protect worker health and safety.	Same as Alternative 1.	No impact.
Socioeconomic Resources	Negligible impact.	Same as Alternative 1.	No impact.
Environmental Justice	No impact.	Same as Alternative 1.	No impact.

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3. AFFECTED ENVIRONMENT

3.1 Scope of the Analysis

The potentially affected human environment is interpreted comprehensively to include natural and physical resources and the relationship of people with those resources (40 CFR 1508.14). Information presented in this section serves as a baseline from which to identify and evaluate any individual or cumulative environmental and socioeconomic changes likely to result from implementation of the Proposed Action and the No Action Alternative. In compliance with NEPA, CEQ regulations, and 32 CFR 989, the description of the affected environment focuses on those resources and conditions potentially subject to effects, thus laying the groundwork for discussions of potential environmental impacts to each resource. As such, relevant natural and physical resources were selected for analysis in this section.

The affected environment includes existing environmental, cultural, and socioeconomic conditions within the Region of Influence (ROI) for proposed and alternative actions. For the purposes of this analysis, the ROI is generally defined as the proposed limits of disturbance and the immediate local area.

The sections for each resource topic begin with an introduction that defines the resources addressed in the section. Following the introduction for each resource topic, information is presented about any federal, state, or local regulatory requirements related to the resource and relevant to the proposed and alternative actions. Finally, existing environmental conditions in the ROI are described. This information provides a frame of reference about conditions that prevail currently or existed in the recent past.

Resource information for this EA was obtained through review of existing environmental documents, available Geographic Information System (GIS) data, field observations, and communications with Patrick AFB staff, regulatory agencies, and other agencies and organizations. Information is presented to the level of detail necessary to support the analysis of potential direct and indirect impacts in Section 4, Environmental Consequences. Qualified technical subject matter experts examined each action alternative for potential effects on each technical resource area considering the scope of the action and available resource information. The examination resulted in certain resources being dismissed from detailed analysis. Those resources that were dismissed are addressed in Section 3.1.2.

3.1.1 Resources Analyzed

Based on the components of the Proposed Action and comments resulting from interagency coordination, Patrick AFB identified the resources potentially affected by the proposed construction and operation of six beach recreation cottages. As a result, six resource categories were identified for detailed analysis based on their potential to be impacted by Alternative 1, Alternative 2, and/or the No-Action Alternative. These included (1) air quality resources, (2) water resources, (3) biological / natural resources, (4) earth resources, (5) cultural resources, and (6) safety and occupational health.

3.1.2 Resources Eliminated from Detailed Analysis

Several resources were not evaluated in this EA because it was determined that implementing any of the alternatives would have negligible to no impacts and do not otherwise require specific agency coordination or consultation. The resources eliminated from detailed analysis are (1) airspace, (2) noise / acoustic environment, (3) hazardous materials / waste, (4) land use, (5) infrastructure / utilities, (6) socioeconomics, and (7) environmental justice.

A brief explanation of the reasons why each resource was eliminated from further consideration in this EA is provided below.

3.1.2.1 Airspace

Implementation of the Proposed Action would not result in in any changes to airspace management or use. Management of the airspace would remain consistent with current practices. Therefore, this resource category was eliminated from further analysis.

3.1.2.2 Noise / Acoustic Environment

The Proposed Action would have minimal short-term impacts on the acoustic environment during construction. The increase in noise would be caused by heavy paving and construction-related equipment. Construction activities would be restricted to daylight hours. Current dominant noise sources in the vicinity of the Proposed Action area include traffic on SR A1A and wind/surf. There are no sensitive noise receptors within one-mile of the Proposed Action site. Any additional noise generated by the additional traffic or beach activities would be negligible relative to current conditions. Therefore, this resource category was eliminated from further analysis.

3.1.2.3 Hazardous Material / Waste

Hazardous materials are substances that are considered severely harmful to human health and the environment. Many are commonly used substances that are harmless in their normal uses but are quite dangerous when released. They are defined in terms of those substances specifically designated as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the Superfund law (42 USC § 9601 et seq.). The use or release of hazardous materials usually results in the generation of hazardous waste. The Proposed Action would not use, store, or generate hazardous materials or waste. No hazardous materials or waste are known or expected to be present on or near the proposed beach lodges. The Proposed Action would not impact any USAF Installation Restoration Program sites. During construction of the recreational beach lodges, all equipment would be inspected daily to ensure that any fluid leaks are promptly repaired. Therefore, hazardous materials and waste would not be impacted and are not further evaluated in this EA.

3.1.2.4 Land Use

The Proposed Action site is located in the Patrick AFB Ocean Planning District. This District serves as the primary center for community support for Patrick AFB, with facilities and activities supporting the daily lives of installation personnel, officers, Airmen, and their families. This planning district serves as the hub of support activities and includes administration, recreation opportunities, the Manatee Golf Course and Marina, Army and Air Force Exchange Service facilities, as well as privatized accompanied housing. The proposed beach cottages would be constructed on land designated as Privatized Accompanied Housing with Open Space (Patrick AFB 2017a). The Proposed Action is consistent with this land use. Therefore, land use would not be impacted and is not further evaluated in this EA.

3.1.2.5 Infrastructure / Utilities

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. Infrastructure and utilities include transportation, water supply, sanitary sewage/wastewater, natural gas, electrical, communications, and liquid fuels. All required utilities (i.e., potable water, sanitary sewer, electrical,

communications, and roads) are available to the Proposed Action site, and capacity is adequate (USAF 2017). The Proposed Action would include 18 parking spaces with no new/additional driveways constructed. The additional traffic from the Proposed Action would be negligible relative to the 2017 Annual Average Daily Traffic (AADT) (i.e., the total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year) of 25,000 vehicles on this stretch of SR A1A (FDOT 2017a). The negligible increase in traffic would have no discernable effect on the Level of Service (LOS) for SR A1A in the project area (the LOS is currently "C", which is the FDOT target for components of the State Highway System outside of urban areas (FDOT 2017b).

The proposed beach cottages would have a negligible impact on existing infrastructure and utilities. Therefore, this resource category is not further evaluated.

3.1.2.6 Socioeconomics

Socioeconomic resources are defined as the basic attributes associated with the human environment, and generally include factors associated with population, housing, education, and economic activity. Economic activity is typically described in terms of employment, personal income, and regional industries. Changes to these fundamental components can influence other community resources, such as housing availability, utility capabilities, and public services. The socioeconomic conditions of a ROI could be affected by changes in the rate of population growth, changes in the demographic characteristics of a ROI, or changes in employment within the ROI caused by the implementation of the Proposed Action.

The Proposed Action would result in a negligible short-term increase in construction jobs over a 7- to 10-month period. No additional personnel would be relocated to Patrick AFB as a result of the Proposed Action. Considering that Patrick AFB's economic impact to the economy was an estimated $1.09 billion in Fiscal Year (FY) 2017 (the most recent year for which such data are available), and the installation employed over 15,000 people during that time (Patrick AFB 2017), any changes to socioeconomic conditions attributable to the Proposed Action would be negligible. Therefore, socioeconomics are not further evaluated in this EA.

3.1.2.7 Environmental Justice

The U.S. Environmental Protection Agency (EPA) defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, sex, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies." EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to consider disproportionately high adverse effects on the human or environmental health to minority and low-income populations resulting from implementation of a Proposed Action.

The Proposed Action would not disproportionately and adversely impact low-income and minority populations. The Proposed Action would occur completely within Patrick AFB boundaries. Therefore, no impacts to environmental justice would be anticipated, and this resource is not further evaluated in this EA.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." Implementation of the Proposed Action would not result in increased exposure of children to environmental health or safety risks such as those associated with the generation, use, or

storage of hazardous materials. Standard construction site safety precautions (e.g., fencing and other security measures) would reduce potential risks to minimal levels. Therefore, no impacts to children would be anticipated, and this resource is not further evaluated.

3.2 Air Quality

3.2.1 Definition of Resource

Air quality is the degree to which the air is suitable or clean enough for humans, animals, or plants to remain healthy. Air quality is described in terms of the type and amount of pollutants that are present in the local atmosphere. The amount of air pollutant in the air is generally expressed as a concentration in units of parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter ($\mu g/m^3$).

Factors that contribute to or affect air quality are local and regional air emissions, geographical size of the air basin, topography, and prevailing meteorological conditions. Air emissions can occur from human activities (e.g., industrial process, fuel combustion, motor vehicles) and natural events (e.g., wildfires, wind-blown dust). Meteorological conditions (temperature, wind speed, wind direction, amount of sunshine, and temperature inversions) influence the extent to which pollutants are dispersed and transported both vertically and horizontally within the atmosphere. Pollutant concentrations in the atmosphere near emission sources are generally highest with light winds or strong temperature inversions, both of which limit the transport of pollutants away from the emission source. The EPA has divided air pollutants into several categories: criteria pollutants, hazardous air pollutants, and greenhouse gases.

3.2.1.1 Criteria Pollutants

Under the Clean Air Act (CAA), the EPA established the National Ambient Air Quality Standards (NAAQS) for six common air pollutants referred to as the "criteria pollutants." These including: carbon monoxide (CO), lead (Pb), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM). Particulate matter is presented in the NAAQS in terms of particulate matter less than or equal to 10 micrometers in diameter (PM10) and particulate matter less than or equal to 2.5 micrometers in diameter (PM2.5). These are the most common pollutants associated with human activities and natural events. The NAAQS represent maximum levels of air pollution that are considered safe for public health and the environment. The State of Florida relies on the NAAQS for describing air quality conditions within the state.

The EPA is responsible for characterizing and designating a region's air quality status with respect to the NAAQS. A regional designation is made for each criteria pollutant based on ambient air monitoring data collected and verified by the state environmental agencies:

Attainment – in compliance with the NAAQS.

Non-attainment – the NAAQS is not being met.

Maintenance – a region that was previously classified as "nonattainment," but is now in compliance with the NAAQS may be redesignated as "maintenance" if the state has completed an air quality maintenance plan and has successfully demonstrated that the plan is effective in producing necessary emission reductions along with air quality improvements.

Unclassified – no monitoring data is available. By default, these areas are considered to be in attainment.

3.2.1.2 Hazardous Air Pollutants

Hazardous air pollutants (HAPs), also known as toxic air pollutants or air toxics, include a group of 187 pollutants identified by the EPA as having the potential to cause cancer or other serious health effects such as reproductive effects, birth defects, or adverse environmental and ecological effects. These are generally associated with manufacturing and other industrial or fuel combustion processes but are emitted in much lower quantities than the criteria pollutants.

3.2.1.3 Greenhouse Gases

Greenhouse gases (GHGs) have the tendency to affect the earth's atmospheric temperature through physical processes involving both light and thermal energy. GHGs exist in the atmosphere as a result of both natural processes and human activity. Among the most prominent GHGs associated with human activities are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These gases are a combustion byproduct of fossil fuel (i.e., gasoline, diesel, oil, coal, and natural gas) and other organic matter such as wood. Other pollutants that are considered to be GHGs, but which are much less prevalent in the atmosphere, include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF), and nitrogen trifluoride (NF_3). In recent years, GHG emissions from human activity have become a focus of concern and scrutiny as these relate to climate change. GHGs are presented in terms of CO_2 equivalent (CO_2-e)[1] emissions per year.

3.2.2 Regulations

Regulatory requirements at the federal, state, and local levels associated with air quality have been established to protect air quality. These include the air quality standards, state implementation plans, air permitting programs, emissions monitoring programs, and protection of environmentally sensitive areas. As a means of tracking and managing air pollutant emissions within a state's borders, federal, state, and local air quality regulations require any new or modified stationary emission source (i.e., facility) to obtain a permit to construct and operate if its potential emissions would be above certain thresholds of criteria and non-criteria pollutants. The purpose of air permitting is to establish regulatory control over both small and large industrial activities, providing a means for monitoring their impact on air quality. An air permit identifies the facility's operating air emission sources, allowable emission levels, and conditions of operation. However, the regulations also provide exemptions from air permitting requirements for certain types and sizes of emission activities. Although an air permit is generally needed for certain air emission sources at a facility, the air emissions associated with construction activities are not covered under the permitting process.

In addition to the air quality regulations referenced above, the General Conformity Rule was established under CAA § 176(c)(4) specifically to ensure that actions taken by federal agencies in NAAQS nonattainment and maintenance areas do not interfere with a state's plans for bringing these areas back into attainment with the air quality standards. Unlike the air permitting programs that only consider emissions from stationary sources, the General Conformity Rule requires federal agencies to consider emissions from all activities associated with the proposed federal action including new or modified stationary, mobile, and fugitive emission sources. The requirements of the General Conformity Rule do not apply to federal actions located in NAAQS attainment areas.

[1] Greenhouse Gases are typically presented as CO_2 Equivalent = (1 × Carbon Dioxide emissions) + (25 × Methane emissions) + (298 × Nitrous Oxide emissions). The three main greenhouse gases are carbon dioxide, methane, and nitrous oxide. Methane and nitrous oxide have a 25 and 298 times higher, respective, global warming potential than carbon dioxide. The other four GHGs have very high global warming potentials, but these are generally countered by much lower levels of emissions.

3.2.3 Existing Conditions

3.2.3.1 Climate

The Proposed Action would occur in Brevard County along the east coast of central Florida which has a humid subtropical climate with significant influence from the tropics. It is characterized by hot, humid summers and mild winters. The annual mean temperature is 72°F (Melbourne, Florida). Daily average temperatures range from 61°F in January to 82°F in August. Total precipitation averages 50 inches per year with June through September being the wettest at 7-8 inches per month and November through April averaging about 2 inches per month (Western Regional Climate Center [SERCC], 2019). The winds are predominantly from the east during the spring and summer months and from the north-northwest during winter months. The annual average wind speed is 8 miles per hour. Peak winds are highest during the summer through autumn months due to influences from tropical cyclones (National Climatic Data Center [NCDC], 1998)

3.2.3.2 Local Air Quality

The FDEP operates air quality monitoring sites throughout the state for the six criteria pollutants, including two monitoring stations located within Brevard County, for evaluating the air quality status relative to the NAAQS. Brevard County, where the project site is located, is designated as attainment areas for all NAAQS pollutants (40 CFR §81.310 - Florida).

In addition, the EPA maintains a national database of air pollutant emissions using data provided by each state on a county-by-county basis. The National Emissions Inventory (NEI) is used for monitoring emission trends and evaluating the effectiveness of emission reduction strategies. It includes reported criteria pollutant and HAP emissions from permitted stationary sources and estimated emissions from a wide range of non-permitted sources and mobile sources. Although the EPA conducts a comprehensive emission inventory every three years, developing and updating the inventory is time-consuming. The most recent NEI data available to the public is for the year 2014, and can be obtained through the EPA website http://www.epa.gov/air-emissions-inventories. **Table 4** presents the most recently available baseline emissions inventory of criteria pollutants (except ozone) for Brevard County. Ozone is not included in the NEI data as it is generally not emitted directly into the atmosphere. Instead, it is formed in the lower atmosphere by chemical reactions between precursor pollutants in the presence of sunlight. Nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs) are the main precursors of O_3.

Table 4. 2014 Baseline Emissions for Brevard County.

Source Category	Emissions (ton/year) [A]							
	CO	Lead	NOx	PM10	PM2.5	SO_2	VOC	HAPs
Stationary Sources	29,552	0.02	1,942	7,620	5,816	652	40,328	5,518
Mobile Sources	85,182	1.13	13,927	19,376	2,786	655	9,459	2,773
Total	**114,734**	**1.15**	**15,869**	**29,996**	**8,602**	**1,307**	**49,787**	**8,291**

[A] Brevard County emissions reported in tons per year from the 2014 National Emissions Inventory.

3.2.4 Emissions at Patrick AFB

Patrick AFB prepares annual air emissions inventories as a requirement by the USAF using the Air Program Information Management System (APIMS). An emissions inventory identifies the actual level of

air emissions associated with the actual (not potential) operations at the base. The most recent available air emissions inventory for Patrick AFB is for year 2016 and is presented in **Table 5**. The base, which had previously been permitted under the federal Title V air permitting program, was reclassified in March 2017 as an exempt air emission source due to a reduction in stationary source air emission levels.

Table 5. 2016 Facility Emissions for Patrick AFB.

Source Category	Emissions (ton/year) [(A)]							
	CO	**Lead**	**NOx**	**PM10**	**PM2.5**	**SO_2**	**VOC**	**HAPs**
Stationary Sources	3.0	0.0002	6.2	17.8	10..8	0.1	3.5	0.24
Mobile Sources	170	0	88.1	18.5	13.2	8.8	53.1	2.36
Total	**173**	**0.0002**	**94.3**	**36.3**	**24.0**	**8.9**	**56.6**	**2.6**

[(A)] County level emission totals reported in tons per year from the 2014 National Emissions Inventory.

3.3 Water Resources

3.3.1 Definition of Resource

Water resources analyzed in this EA include surface water and groundwater. Natural surface water resources include the oceans, lakes, rivers, and streams that collect and distribute water from precipitation and runoff from the land. Human-created water collection systems include ditches, canals, and stormwater systems. Groundwater can be defined as subsurface water resources that are interlaid in layers of rock and soil and recharged by surface water seepage. Other issues relevant to water resources include watershed areas affected by existing and potential hazards related to floodplains. Additionally, this section of the EA includes an analysis of coastal resources for consistency with the Federal Coastal Zone Management Act (CZMA).

3.3.2 Existing Conditions

3.3.2.1 Surface Water

Patrick AFB is located within the Indian River Lagoon watershed (South Banana River sub watershed) and is bordered to the east by the Atlantic Ocean and to the west by the Banana River. These two water bodies represent the major surface water resources impacting Patrick AFB. In addition to these two resources, Patrick AFB contains five man-made ponds (totaling 31.3 acres), 4.1 miles of drainage ditches, and 40.2 acres of canals. Most of the drainage ditches contain water throughout the year because they intersect the shallow water table aquifer. Several canals are interconnected with the Banana River and are brackish, but do not have significant tidal influences because ocean inlets are far from Patrick AFB (USAF 2005).

3.3.2.2 Water Quality

The FDEP uses water quality data from a wide variety of sources, including its own monitoring programs, to regularly assess Florida's rivers, lakes, springs and estuaries. Based on these assessments FDEP determines whether the water body meets publicly adopted water quality standards. These standards are established to protect public health, preserve aquatic habitat and wildlife, and assure safe and healthy fishing and recreational uses. Surface waters that do not meet the standards set for them are determined to be "impaired" and in need of restoration.

Surface water quality management protocols are developed and implemented within each installation. These measures limit impacts associated with training and construction activities to surface waterways located within and in the vicinity of these areas. Impaired waters of the Banana River are managed under the Banana River Lagoon Basin Management Action Plan to address Total Daily Maximum Loads.

Stormwater would be retained onsite and eventually incorporated into the existing stormwater system that discharges into the Banana River. The USAF would be required to obtain a stormwater permit from the St. Johns River Water Management District (SJRWMD). Because the limits of disturbance exceed one acre, construction activities would be conducted in accordance with a Construction Generic Permit for small construction activity issued by the FDEP.

3.3.2.3 Groundwater

The surficial aquifer system is contained in undifferentiated Late Miocene, Pliocene, and Recent Pleistocene deposits. These deposits are composed primarily of medium to coarse quartz sands, with coquina and shell occurring more frequently at depth (USAF 2015b). The surficial aquifer is hydrologically separated from the underlying Floridian aquifer by sediments of the Hawthorn Group of Miocene Age. The low permeability clays, silts, and marls of the Hawthorn Group are considered the aquitard between the non-artesian surficial and the artesian Floridian aquifer system. The Floridian aquifer system consists of a series of highly permeable limestone formations including the Ocala Group and the Avon Park Limestone, both of Eocene age. Water enters the surficial aquifer through direct infiltration from the percolation of rainwater. Groundwater deeper than the surficial aquifer is affected more by regional boundaries such as the Atlantic Ocean and the Banana River. Rates of groundwater movement are generally substantially less than one foot per day. The surficial aquifer is typically classified by FDEP as a Class G-II aquifer (less than 10,000 milligrams per liter [mg/L] total dissolved solids [TDS]). Class G-II is defined as able to supply water treatable for human consumption (USAF 2015b). Potable water supplied to the base is provided by the City of Cocoa and the City of Melbourne, with committed capacities of 2.6 million gallons per day and 1.0 million gallons per day, respectively (USAF 2011). The water supplies for each of these cities comprise well fields, reservoirs, and tertiary water treatment plants.

A geotechnical survey was conducted for this project on 30 November 2018 (Universal Engineering Scientists 2018). The existing site groundwater levels were measured by the advancement of 11 boreholes to provide an estimate of the typical wet season high groundwater levels at the project site. The groundwater level depths ranged from 3.6 feet below land surface (bls) in the northwest portion of the site to 7.7 feet bls near the eastern boundary. The geotechnical report stated that groundwater levels are likely to fluctuate throughout the year, primarily due to seasonal variations in rainfall, surface runoff, and other factors.

3.3.2.4 Floodplains

Floodplains are topographically low areas along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplains moderate, store, and convey floodwaters; recharge groundwater; facilitate nutrient cycling; maintain water quality; and provide habitat for a diversity of plants and animals. Flood risk is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain as an area within which there is a 1% chance of inundation by a flood event in a given year. Flooding risk is influenced by local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and upstream development.

The entire project site is located within Zone VE 100-year floodplain. Zone VE is the flood insurance rate zone that corresponds to areas within the 1-percent annual chance coastal floodplain that have additional

hazards associated with storm waves. Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

3.3.2.5 Coastal Zone Management Act Consistency

In 1972, the U.S. Congress enacted the CZMA (16 U.S. Code [USC] 1451-1464) to assist coastal states, Great Lakes states, and U.S. territories to develop coastal management programs, and comprehensively manage and balance competing uses of and impacts to coastal resources. The Florida Coastal Management Program (FCMP) was approved by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) in 1981 and is codified as Florida Statutes, Chapter 380, Part II (FDEP 2019). The geography of Florida and the CZMA dictate that the entire State of Florida, including Patrick AFB, be designated as a Coastal Zone and be subject to the FCMP. The FCMP consists of a network of 24 Florida Statutes administered by eight state agencies and five Water Management Districts (WMDs). Under provisions of the CZMA, any Federal activity that has the potential to affect Florida's coastal resources is reviewed for consistency with the FCMP, which is administered by FDEP. The U.S Air Force's Coastal Zone Management Act Federal Consistency Determination is at Appendix B. This EA, including the AF's consistency statement, was submitted to the Florida Clearinghouse for a multi-agency review, and they deemed the actions consistent with the FCMP in a letter dated 07 October 2019.

3.4 Biological / Natural Resources

3.4.1 Definition of Resource

Biological resources include native or naturalized plants, fish, wildlife, and the habitats in which they occur. Sensitive biological resources are defined as those plant, fish, and wildlife species, and their habitat that are federally and state listed as threatened, endangered, of special concern, or candidate. The USFWS identifies and lists federally protected species and habitats; states also identify and list protected species and habitat. **Table 6** provides an overview of major natural resource requirements. The Florida Fish and Wildlife Conservation Commission (FWC) identifies and lists state protected species and habitats for the state. The Federal Endangered Species Act (ESA) of 1973 protects listed species against killing, harming, harassment, or any action that may damage their habitat. Federal Species of Concern are not protected under the ESA; however, these species could become listed and protected at any time. Florida state listed species and their habitats are protected in accordance with Florida Statutes §379.2291-379.231.

Migratory birds, as listed in 50 CFR 10.13, are protected by the Migratory Bird Treaty Act (MBTA), as amended. The MBTA was enacted to protect migratory birds from capture, pursuit, hunting, or removal from natural habitat. Over 800 bird species are currently protected under the MBTA. In 2001, Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to ensure that Federal agencies consider environmental effects on migratory bird species and, where feasible, implement policies and programs supporting the conservation and protection of migratory birds.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the ESA and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands, sensitive upland communities, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, feeding/forage areas, crucial summer/winter habitats).

Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the Clean Water Act (CWA) and EO 11990, *Protection of Wetlands*. Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and the EPA as, "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3[b]). The USACE has authority to regulate jurisdictional wetlands as Waters of the U.S. under

Section 404 of the CWA; however, EO 11990, Protection of Wetlands and the related DoD Instruction 4715.3, Natural Resources Conservation Program provide guidance concerning how to mitigate or minimize any net loss of both jurisdictional and non-jurisdictional wetlands.

3.4.2 Existing Conditions

3.4.2.1 Vegetation

Patrick AFB is heavily developed and the majority of vegetation (43 percent), consists of turf and landscaping. Mowed grass and landscaped vegetation surrounds developed areas (i.e., golf course and facilities), roadways, and the airfield. The two natural vegetation communities that can be found on the installation include beach dunes and estuarine wetlands, which are comprised of mangrove and salt marsh communities (USAF 2014). However, the beach and associated dune vegetation represent less than 4 percent of Patrick AFB's total land area.

As of 2014, federally or state listed plant species include shell mound prickly-pear cactus (*Opuntia stricta*), beach star (*Remirea maritime*), and inkberry (*Scaevola plumieri*) (USAF 2014). State law also affords some protection to the black mangrove (*Avicennia germinans*), red mangrove (*Rhizophora mangle*), and white mangrove (*Laguncularia racemosa*). These species occur along the Banana River shoreline and the edges of some canals (FDEP 2019).

The Proposed Action site is almost entirely in turf grass that is regularly mowed. A small number of palm trees (approximately 25) are scattered throughout the site. Vegetation on the foredune where the proposed boardwalks would be located consists primarily of sea grapes (*Coccoloba uvifer*a) that are approximately 12-15 feet high (Figure 5).

3.4.2.2 Wildlife

Patrick AFB is largely developed and consists primarily of turf and landscaped areas. However, the base contains two natural communities which include beach dune and estuarine wetlands. These two natural communities comprise approximately 32 acres of the base's land area and provide habitat to various wildlife species, including 6 mammalian species, 8 amphibian and reptile species, and 42 bird species which are known to occur on or in within the vicinity of the base. A detailed list of vegetation and wildlife species which have been documented on Patrick AFB is provided in the Integrated Natural Resources Management Plan (INRMP) (USAF 2015b). The Proposed Action site provides very limited wildlife habitat.

3.4.2.3 Wetlands

A jurisdictional wetland determination within Patrick AFB was conducted by USACE in 2006. The USACE provided this wetland delineation to the USAF, but the determination expired in 2011. However, USACE still identifies the canals that directly connect with the Banana River as jurisdictional. Other isolated wetlands exist on Patrick AFB but are assessed by 45 CES/CEIE-C and regulators based on potential project site boundaries and permitting requirements due to variable hydrography (USAF 2014). According to the USFWS National Wetlands Inventory (NWI) potential wetlands on Patrick AFB are concentrated along the coast and include estuarine and marine habitats (USFWS 2015b). Data from the NWI identifies numerous surface water features on Patrick AFB; however, these features are resultant primarily from excavated canals used for storm water drainage. The NWI aerial imagery data as well as a wetland survey in the 1990's both indicate that no natural wetlands occur on Patrick AFB, only wetlands associated with the Banana River and some isolated wetlands claimed by SJRWMD on a case-by-case basis**.** Additionally, the findings from the 2006 USACE jurisdictional wetland survey only included waterways that had a direct connection with the Banana River (USAF 2014). There are no wetlands on the Proposed Action site.

828 Table 6. Summary of Biological / Natural Resources Regulation Requirements.

Law or Rule	Permit/Action(s)	Requirement	Agency or Organization
Coastal Zone Management Act 16 U.S.C § 1451, et seq	Coordination with FDEP and Federal Consistency Determination.	Consistent with FCMP to conserve and protect coastal environment through standards and criteria for regulations and guidelines for uses of the coastal zone.	FDEP
Endangered Species Act 16 U.S.C § 1531, et seq.	Consultation with US fish and Wildlife Service (USFWS) and if necessary, obtain and comply with biological opinions/incidental take permits, comply with existing Threatened and Endangered (T&E) permits.	Conserve ecosystems that support T&E species. Section 7 requires Federal agencies to ensure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.	USFWS
Sikes Act 16 U.S.C. § 670, et seq.	Cooperation between the Department of Interior and Department of Defense with State agencies to plan, develop and maintain fish and wildlife resources on U.S. military installations.	Development of an Integrated Natural Resource Management Plan (45 SW properties) that is reviewed/approved by USFWS, NMFS, & FDEP/FWC.	DoD
Migratory Bird Treaty Act 16 U.S.C § 703-712	Consult with USFWS as necessary.	Prohibits intentional destruction of the eggs or nest of migratory birds without a permit. Beach nesting locations must be protected and voided during beach restoration activities.	USFWS
Executive Order (EO) 11988	Avoidance of floodplain impacts to the extent practicable, prepare Finding of No Practicable Alternative if necessary.	Reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains.	DoD
EO 13112	Remove and control invasive species	Prevent the introduction of invasive species and provide for their control.	DoD
AFI 32-7064	Long-term management of natural areas on the Installation.	Protect listed species, biodiversity, wetlands, etc.	DoD/AF
45 SWI 32-7001	Use full cut off, well shielded, low wattage, low pressure sodium or amber lights.	Reduce the amount of exterior lighting visible from the beach during the sea turtle nesting season to reduce mortality.	45 SW
Florida Statute 379.2431 Florida Marine Turtle Protection Act	Consult with USFWS as necessary.	To ensure that the FWC has the appropriate authority and resources to implement its responsibilities under the recovery plans of the USFWS for five species of marine turtle.	USFWS/FWC
Florida Administrative Code (FAC) Chapter 62 B Beaches and Coastal System Rule: FAC 62B-55, Model Lighting Ordinance for Marine Turtle Protection Rule	Consult with USFWS as necessary.	Protect hatchling marine turtles from the adverse effects of artificial lighting, provide overall improvement in nesting habitat degraded by light pollution, and increase successful nesting activity and production of hatchlings.	USFWS

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Figure 5. Proposed Action Site Dune Vegetation

3.4.2.4 Special Status Species

Patrick AFB is located on a barrier island, which provides important natural areas to support many plants, wildlife, and natural communities. Barrier islands along the Atlantic Coast are especially important for nesting sea turtles, populations of small mammals, and as foraging and habitat for a variety of resident and migratory shorebirds, wading birds, and song birds. Patrick AFB is located along one of the major migratory pathways for neotropical migratory birds that breed in eastern North America. Various species of wildlife inhabit, utilize, or frequent Patrick AFB. The beach at Patrick AFB is used by protected marine turtles for nesting/hatching historically from March to November. The federally-threatened loggerhead (*Caretta caretta*) and endangered green (*Chelonia mydas*) sea turtles are the most common species found nesting on the beaches along the Patrick AFB eastern shore. The endangered leatherback sea turtle (*Dermochelys coriacea*) has also been known to intermittently nest on Patrick AFB beaches. The federally endangered hawksbill sea turtle (*Eretmochelys imbricate*) and Kemp's ridley sea turtle (*Lepidochelys kempii*) are not known to nest on Patrick AFB beaches, but could occur in the water adjacent to the installation.

Sea turtles are impacted by artificial lighting and may become disoriented (loss of bearing). The USFWS issued a Biological Opinion (BO) to the 45th SW in 2008 that addresses light management on the installation. The USAF has developed a project specific lighting management plan for this Proposed Action that adheres to the BO requirements and complies with 45th SW Instruction 32-7001, *Exterior Lighting Management* (06 November 2012) (Appendix C).

Although there are no federally designated critical habitat areas located on Patrick AFB, critical habitat for West Indian manatees and the North Atlantic right whale is mapped within the Banana River and along the Atlantic Coast (USAF 2015b). Critical habitat for the loggerhead sea turtle has been mapped along the Atlantic Coast. **Table 7** provides a list of federal and state listed species that are known to occur, or could potentially occur, on Patrick AFB.

857 Table 7. Federal and State Listed Species that Occur or Could Potentially occur on Patrick AFB.

Species		Status
Common Name	**Scientific Name**	
Shell Mound Prickly- Pear Cactus	*Opuntia stricta*	ST
Beach Star	*Remirea maritima*	SE
Scaevola, Inkberry	*Scaevola plumieri*	ST
Roseate Spoonbill*	*Platalea ajaja*	ST
Piping Plover*	*Charadrius melodus*	FT
Little Blue Heron	*Egretta caerulea*	ST
Reddish Egret*	*Egretta rufescens*	ST
Tricolored Heron	*Egretta tricolor*	ST
Southeastern American Kestrel	*Falco sparverius paulus*	ST
American Oystercatcher	*Haematopus palliatus*	ST
Wood Stork	*Mycteria americana*	FT
Black Skimmer	*Rynchops niger*	ST
Least Tern	*Sterna antillarum*	ST
Smalltooth Sawfish	*Pristis pectinata*	FE
American Alligator	*Alligator mississippiensis*	FT (S/A)
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	FE
Loggerhead Sea Turtle	*Caretta caretta*	FT
Green Sea Turtle	*Chelonia mydas*	FT
Leatherback Turtle	*Dermochelys coriacea*	FE
Hawksbill Sea Turtle*	*Eretmochelys imbricata*	FE
Gopher Tortoise	*Gopherus polyphemus*	ST
Eastern Indigo Snake	*Drymarchon corias couperi*	FT
North Atlantic Right Whale*	*Balaena glacialis*	FE
Sei Whale*	*Balaenoptera borealis*	FE
Fin Whale*	*Balaenoptera physalus*	FE
Humpback Whale*	*Megaptera novaeanglia*	FE
Florida Manatee	*Trichechus manatus latirostris*	FT

T =State Threatened
E = State Endangered
S/A = Similar Appearance
FT = Federally Threatened
FE = Federally Endangered

Sources: FFWCC, 2018.

* Not observed on Patrick AFB but known to occur in the vicinity.

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3.4.2.5 Migratory Birds and Eagles

The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, in addition to their eggs, parts, and nests. The MBTA regulates the taking of migratory birds for educational, scientific, and recreational purposes and requires harvest to be limited to levels that prevent overuse. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11).

According to 50 CFR 21.15, the Armed Forces is authorized to take migratory birds incidental to military readiness activities. It also requires the Armed Forces to develop and implement appropriate conservation measures if a Proposed Action may have a significant adverse effect on a migratory bird population.

The Bald and Golden Eagle Protection Act (Eagle Act) (16 USC 668-668c), enacted in 1940, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Eagle Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, outlines the responsibilities of federal agencies to protect migratory birds, in accordance with the MBTA, the Eagle Act, the Fish and Wildlife Coordination Act, ESA, and NEPA. This order specifies the following:

- The USFWS is the lead agency for coordinating and implementing EO 13186; and
- Federal agencies are required to incorporate migratory bird protection measures into their activities.

There are very few scattered trees located within the Proposed Action site, and habitat for ground-nesting migratory birds is limited due to frequent mowing.

3.5 Earth Resources

3.5.1 Definition of Resource

Earth resources include topography, geology, and soils. 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 effects of a Proposed Action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development. Effects on geology and soils could be significant if any of the following occur:

- Alteration of the lithology, stratigraphy, and geological structures that control groundwater quality;
- Alteration of the distribution of aquifers and confining beds, and groundwater availability; and
- Changes in the soil composition, structure, or function within the environment.

3.5.2 Existing Conditions

Sediments underlying Patrick AFB have accumulated in alternating periods of deposition and erosion since the Eocene. Surface sediments are of Pleistocene and Recent ages. Fluctuating sea levels with the alternating glacial/interglacial cycles have shaped the formation of the barrier island where Patrick AFB is located.

In general, barrier islands have sandy, well-drained soils on the central and eastern portions of the islands, and poorly-drained tidal swamps along their western shore. Soils of Patrick AFB reflect the complexity of soil forming factors (parent material, topography, time, and biota) on the landscape. Numerous soil series are represented. Within a given area, soils vary from well to poorly drained. On well drained sites of differing ages, leaching has modified soil properties. Parent material differences (sand, loam, clay, coquina*)* are also reflected in the soil pattern.

Soils within the proposed construction limits of disturbance are classified as *Canaveral-Palm Beach-Urban land complex* (USDA 2019). This unit is generally level (0-2 percent slopes), somewhat poorly drained, and is characterized by sands and coarse sands to a depth of 80 inches. It is not classified as Prime Farmland or a hydric soil. No construction or soil disturbance would occur in the *Beaches* map unit immediately east of the construction limits of disturbance, although limited vegetation clearing with hand tools may be required to extend a path east from the proposed boardwalk.

Universal Engineering Sciences (2018) conducted a geotechnical investigation of the proposed site to assess suitability for implementing both alternatives. Borings indicated that soils consisted of fine sands with broken shell. The geotechnical investigation did not identify any issues that would significantly hinder the Proposed Action.

3.6 Cultural Resources

3.6.1 Definition of Resource

Cultural resources include any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic properties, and traditional resources. Archaeological resources are found at locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles, etc.). Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources eligible for listing, or listed in, the National Register of Historic Places (NRHP). Traditional resources are associated with cultural practices and beliefs of a living community that are rooted in its history and important in maintaining the community's continuing cultural identity.

For any undertaking, the Section 106 process requires identification of historic properties (i.e., those on or eligible for the NRHP), assessment of potential adverse project effects on any historic properties, and resolution of adverse effects in consultation with the SHPO and/or, if necessary, the Advisory Council on Historic Preservation (ACHP).

ACHP regulations (36 CFR Part 800) require consultation with the SHPO, the ACHP (if necessary and at their discretion), and Federally-recognized Indian tribes prior to the expenditure of federal funds on the undertaking. In 1999, the DoD promulgated its American Indian and Alaska Native Policy, which emphasized the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires an assessment, through consultation, of the effect proposed DoD actions have on the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the services.

Cultural resource management at USAF installations is established in AFI 32-7065, *Cultural Resources Management*. AFI 32-7065 details compliance requirements for protecting cultural resources through an Integrated Cultural Resources Management Plan (ICRMP).

3.6.2 Existing Conditions

3.6.2.1 Regional Archaeological Setting

Within Patrick AFB, Ais Indians were the primary occupant of the area. The Ais were primarily foragers; hunting, fishing, and gathering for subsistence. They made use of both the freshwater marshes and swamps and the saltwater coastal lagoons. Because they were able to access and abundance of foodstuffs from their immediate environment, they were able to sustain a highly developed cultural system. Turkeys, ducks, deer, raccoons, opossums, rabbits and other small game made up about 15 percent of their diet. At least 80 percent of their diet consisted of fish, reptiles and shellfish such as oysters and clams. They left behind large midden mounds of shell as well as dirt burial mounds (Heritage of the Ancient Ones 2013).

This part of the eastern coast of Florida was reputed for causing shipwrecks. As such, there are many accounts of shipwreck survivors contacting the Ais tribe. Succession of primary European influence included rotating periods of Spanish, French, and English dominance until 1821, when Florida was added as a territory of the United States (Blackman 1973).

3.6.2.2 Archaeological Resources at Patrick AFB

Early settlement of the peninsula where Patrick AFB is located was focused within the Banana River Lagoon salt marsh area; however, archeological evidence suggests that the entire peninsula was exploited for a wide variety of marine, estuarine, and terrestrial resources. At the time of European contact, the peninsula was populated by the Ais tribe (USAF, 2015a).

The U.S. Navy established the installation in 1940 as the Banana River Naval Air Station. The Naval Air Station serves as an active base for ant-submarine sea-patrol planes during World War II. After this installation's deactivation in 1947, it was transferred to the USAF in 1948. It was renamed Patrick AFB in 1950 in honor of the chief of the U.S. Army Service from 1921 to 1927, Major General Mason M. Patrick. At this time the USAF began developing the Eastern Test Range. From 1950 to present, the 45 SW, formerly the Eastern Space and Missile Center, has been responsible for launch, test and support operations associated with the cruise missile program, ballistic missiles, the Apollo and Space Shuttle programs, and the Delta, Atlas, and Titan programs (USAF 2015a).

Patrick AFB is thought to have low potential for on-site archaeological resources. As described in further detail within the ICRMP (USAF 2015a), during World War II the relic dune and swale system common on the barrier island was completely flattened. Historic research has found that 30 percent of the existing base was created using dredged fill during construction of Banana River Naval Air Station in the 1940s. Consequently, any sites that existed prior to 1940 were either destroyed or were so deeply buried the likelihood of finding them is next to impossible. In addition, subsequent development at Patrick AFB resulted in substantial land alteration to the remaining areas within the base boundaries (USAF 2015a). However, while it remains a low probability, there is still potential for buried World War II resources in the form of evidence of former facilities, buried cisterns or wells, and landfills. Archaeological remnants of a World War II Lighter-than-Air (Blimp) Facility (8BR2477) were identified within the airfield at Patrick AFB in August 2011 and is awaiting additional analysis. All inadvertent discoveries of buried cultural material are addressed in SOPs 1 and 3 in the ICRMP (USAF 2015a).

A Phase I Cultural Resources Investigation of the Proposed Action area was conducted by the University of South Florida Digital Heritage and Humanities Collections in December 2018 (USF 2019) included 36 shovel tests within the Proposed Action area. Two of the shovel tests were positive and yielded six artifacts each. None of the artifacts recovered were diagnostic of any specific time period, and no NRHP-eligible sites were identified. Background research determined there was no potential for prehistoric Native American cultural remains anywhere within or adjacent to the project area or PAFB. Resources

tend to be historic (World War II- era or later) in nature. There are also no Traditional Cultural Properties within or adjacent to the project area.

The SHPO concurred with the findings of the assessment and determined that the proposed project will have no effect on historic properties listed, or eligible for listing, on the NRHP in a letter dated 09 May 2019.

3.6.2.3 Historic Building Resources at Patrick AFB

Patrick AFB has only recently been the subject of intensive cultural resource investigations. In 1993, 18 buildings at Patrick AFB were documented with Historic American Buildings Survey (HABS) Level IV standards as part of mitigation measures in compliance with Section 106 of the NHPA. Of these 18 buildings, three (Buildings 800, 400, and 430) were further documented at HABS Level II, and Building 993 was documented at HABS Level III (Jenkins et al. 1993). The Historical and Architectural Documentation Reports of Patrick Air Force Base, Cocoa Beach, Florida (Temme et al. 1994) completed HABS Level IV reports on all extant World War II buildings and structures and all post-1945 buildings and structures related to Patrick AFB's Cold War mission. Each of these 150 buildings or structures was described, photographed, and assessed for NRHP eligibility and current condition. However, this study was never submitted to the SHPO for review. From 2001 to 2011, facilities were addressed on a case-by-case basis when an undertaking involved any building or structure on Patrick AFB. In 2009 the 45 SW entered into consultation with the SHPO to rectify the issues with previous inventory. The previous surveys at Patrick AFB were submitted to the SHPO along with an update.

The updated report and proposed status of all buildings at Patrick AFB 45 years and older was accepted by the SHPO in November 2011 (Florida Department of Historic Resources Project File No. 2011 3861). The SHPO concurred that most of the buildings no longer retained the original characteristics which made them individually NRHP eligible. However, many were eligible for the NRHP as contributing elements to NRHP-eligible Historic Districts. A small number of the facilities date to the World War II naval station with the majority dating to the Cold War Period. Almost every building at Patrick AFB has undergone renovations since their construction. None of these districts was located in the vicinity of the Proposed Action area.

A Phase I Cultural Resources Investigation of the Proposed Action area was conducted by the University of South Florida in December 2018 (USF 2019). The Final Draft Phase I Cultural Resources Assessment included the recordation of the three existing historic beach cottages on the site. The three facilities were assigned individual site numbers (F204-8BR3992, F205-8BR3993, and F206-8BR3994) and recorded as a resource group (8BR3991). The assessment determined that “Although the purpose of the three facilities has remained the same since 1941, renovations have altered the historic fabric and character of the cottages. None of the facilities exhibit uniqueness of design, setting, material, workmanship, feeling, or association. The facilities are not associated with significant events or people, and their lack of an associated archaeological component limits their research potential. Given the above, are survey finds 8BR3991 to not be eligible for listing on the NRHP.” The SHPO concurred with the findings of the assessment and determined that the proposed project will have no effect on historic properties listed, or eligible for listing, on the NRHP in a letter dated 09 May 2019 (Appendix A).

3.7 Occupational Safety and Health

3.7.1 Definition of Resource

This section addresses impacts of the action alternatives on the health and safety of USAF employees, contractors, and others on the Proposed Action site per 32 CFR 989.27. Safety programs, policies, and procedures at Patrick AFB comply with Air Force Policy Directive (AFPD) 91-2 – *Safety Programs* (01 May 2017). All contractors performing work on the Proposed Action site would be responsible for compliance with applicable Occupational Safety and Health Administration (OSHA) regulations concerning occupational hazards and appropriate training and protective measures for their employees. All plans, specifications, and construction activities would follow OSHA construction industry standards outlined in 29 CFR 1926.

3.7.2 Existing Conditions

Patrick AFB has one fire station that is located approximately 2.8 miles south of the Proposed Action site. The USAF is also party to reciprocal fire protection arrangements with fire protection in local communities and the fire department at Cape Canaveral Air Force Station. Fire hydrants are distributed around the installation and tied to the potable water supply system. Two fire hydrants are located east of SR A1A adjacent to the Proposed Action site. Fire flow capability is 1,000 gallons per minute at any single point (USAF 2012). The Cocoa Beach Fire Department is located approximately 3.3 miles north of the Proposed Action site.

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4. ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This section describes the anticipated environmental impacts for resources that would be affected by the two Proposed Action alternatives or the No Action Alternative. The level of analysis required to determine environmental consequences for individual resource areas is based upon the magnitude of the anticipated impact. Resources for which impacts were not readily apparent were analyzed in greater detail than those that would obviously be less than significant.

4.2 Air Quality and Climate Change

AFI 32-7040, *Air Quality Compliance and Resource Management*, provides a framework for ensuring that USAF actions conform to appropriate CAA, federal/state air regulation, and General Conformity Rule requirements. In particular, Section 3.4 of AFI 32-7040, Conformity Rule Planning, applies to and addresses evaluation of federal actions located in NAAQS nonattainment and maintenance areas, and how the action would conform to applicable State Implementation Plans.

Section 3.5 of AFI 32-7040, NEPA, and EIAP outline requirements under NEPA for analysis of air quality impacts and permitting requirements associated with a Proposed Action. The analysis shall consider net emission changes of any NAAQS attainment pollutants, HAPs, or other CAA-regulated pollutants. This section also requires, for completeness, that a General Conformity applicability analysis be performed.

Both Sections 3.4 and 3.5 of AFI 32-7040 require use of the USAF's Air Conformity Applicability Model (ACAM) as the air quality impact assessment tool. The ACAM model has been designed to provide a uniform and consistent method for calculating emissions associated with various construction and Air Force operational activities. The latest ACAM version (5.0.12) was utilized with respect to the Proposed Action.

Impacts to air quality are evaluated in terms of the change in annual air emissions that would result from the Proposed Action alternatives relative to baseline emissions levels. Any air emissions from construction activity would be temporary and result in short-term impact since these are associated with one-time construction events. Any air emissions from operational activity would be a long-term impact because these are associated with recurring activities that would continue for the foreseeable future. Both alternatives would have the potential to directly and indirectly increase air emissions during construction of the beach cottage units. However, there would be no operational air emissions.

With respect to the General Conformity Rule, impacts to air quality would be considered significant if the Proposed Action would result in increased pollutant emissions within the baseline area by 10 percent or more (i.e., regionally significant), or if the increased emissions would exceed *de minimis* threshold levels established for the General Conformity Rule for criteria pollutants already in nonattainment.

4.2.1 Alternative 1 - Single Connection to SR A1A (Preferred Alternative)

Construction Emissions (Fugitive Dust & Combustion)

Alternative 1 would involve construction of three new beach cottage duplex units and associated access roads. Alternative 1 would include construction of three 2,700 square foot residential duplex units with the affected area covering a total footprint of approximately 1.5 acres. No demolition of existing buildings would occur. Site preparation and construction would include stormwater drainage features; asphalt

paving for access roads and driveways; concrete for waffle foundations, sidewalks, patios, and support columns; and gravel fill under paved areas, duplex units, and for the emergency vehicle turnaround. Construction activities would include site grading, excavation, material hauling, paving, and building construction. The areas to be graded and paved (concrete and asphalt) along with the material volumes (soil, gravel, concrete, asphalt) that would be removed and delivered to the site were estimated using the site layout presented in Figure 3 and typical vertical dimensions for the various construction components (i.e., excavation for drainage features, gravel and concrete layer thickness, etc.). The construction activities were assumed to be distributed over a 9-month construction schedule from September 2019 to June 2020.

For Alternative 1, the affected site is approximately 1.5 acres (65,340 square feet). Stormwater drainage features would cover 13,600 square feet with 2,015 cubic yards of excavated material being removed from the site. Asphalt paving for the access roads would cover 16,500 square feet. A concrete volume of 232 cubic yards would be needed for the sidewalks, patios, waffle slab foundation, and support columns. Under this alternative, emissions to the air would be generated as fugitive dust from site preparation activities and from fuel combustion in construction vehicles and power equipment.

The ACAM model was set up to estimate emissions from the various construction activities over the approximated construction schedule. Where applicable, the ACAM default settings were used with respect to construction equipment types, on-road and off-road vehicles, commuting workers, round trip distances, and operating hours. ACAM then calculates emissions for the selected activities on a calendar year basis.

Table 8 presents the Alterative 1 short-term construction activity emissions for years 2019 and 2020 that were calculated with the ACAM model. The ACAM output (summary and detail reports) for this alternative is provided in Appendix D. **Table 9** compares the total construction emissions to the local (Brevard County) baseline in terms of ton per year and percent of baseline.

Table 8. Alternative 1– Emissions from Construction.

Calendar Year	Emissions (tons/year) [A]							
	CO	Lead	NOx	PM10	PM2.5	SO_2	VOC	HAPs
2019	0.465	0.00	0.478	0.329	0.022	0.001	0.075	- [A]
2020	0.465	0.00	0.480	0.184	0.022	0.001	0.117	- [A]
Total	**0.930**	**0.00**	**0.958**	**0.513**	**0.044**	**0.002**	**0.192**	- [A]

[A] The USAF's ACAM model that was used to quantify emissions associated with the proposed project does not provide emission estimates of Hazardous Air Pollutants

Table 9. Alternative 1 – Comparison to Emissions Baselines.

	Total Emissions (tons/year)[A]							
	CO	Lead	NOx	PM10	PM2.5	SO_2	VOC	HAPs
Construction (Total)	0.930	0.00	0.950	0.513	0.044	0.002	0.192	- [A]
Local Baseline	114,734	1.15	15,869	26,996	8,602	1,307	49,787	8,291
Percent of Baseline	0.0008%	0%	0.0060%	0.0019%	0.0005%	0.0002%	0.0004%	- [A]

[A] The USAF's ACAM model that was used to quantify emissions associated with the proposed project does not provide emission estimates of Hazardous Air Pollutants.

Operational Emissions

There would be no operational emissions associated with the proposed duplex units. Therefore, there would be no increase to long-term emissions.

4.2.2 Alternative 2 - Dual Connection to SR A1A

Alternative 2, as presented in Figure 4, would be identical to Alternative 1 with the exception of an approximately 170 feet shortening of the asphalt-paved access road to the new duplex units. Consequently, the construction emissions associated with the alternative would be slightly less. For this reason, a separate ACAM modeling analysis for Alternative 2 was not included. Similarly, there would be no operational emissions for this alternative.

4.2.3 Proposed Action Summary

For the Proposed Action (i.e., either Alternative 1 or Alternative 2), air emissions would increase only from construction activities. Therefore, the only potential impacts to air quality would be related to construction activity. General conformity does not apply because the Florida is in attainment for all NAAQS. No permits would be required.

Construction-related air emissions would be a temporary short-term impact with a duration of less than one year. The local impact to air quality would be 0.0060% or less of the impact associated with the Brevard County baseline emissions. The Proposed Action construction emissions would result in a less than significant impact to the local and regional baseline emissions.

Operational-related air emission increases would not occur with the Proposed Action, and would therefore have no impact to the local and regional baseline emissions.

4.2.4 Alternative 3 – No Action

For the No Action alternative, the construction of the new units would not occur. There would be no new air emissions. No additional air quality impacts would occur under this alternative.

4.3 Water Resources

4.3.1 Alternative 1 - Single Connection to SR A1A (Preferred Alternative)

4.3.1.1 Surface Water

There is no surface water on the project site, so there would be no onsite impacts to surface water. The small addition to stormwater inputs at the existing Banana River discharge would be negligible. Therefore, no significant impacts to surface water would be anticipated.

4.3.1.2 Water Quality

The stormwater retention ponds would be designed to allow settlement of solids before discharge to the Banana River, and the stormwater would not contribute to the causes of impairment on the Banana River. Therefore, no significant impacts to water quality would be anticipated.

4.3.1.3 Groundwater

Alternative 1 would include the installation of auger cast piles below the surficial water table in order to support the beach cottages and allow them to sustain hurricane-force winds. However, the construction would not breach the aquitard over the artesian Floridian Aquifer, and would not introduce contaminants into the surficial aquifer nor result in a drawdown. Therefore, no impacts to groundwater would be anticipated.

4.3.1.4 Floodplains

The entire project site is located within the 100-year floodplain. Implementation of Alternative 1 would result in the placement of fill over two acres within the 100-year floodplain defined by current Federal Emergency Management Agency Flood Insurance Rate Maps. Proposed fill areas would include the entrance road, parking areas, emergency vehicle turnaround, sidewalks, and patios. The fill would level the site and provide a suitable construction base, but would not appreciably elevate the ground surface. The beach cottages would be elevated on stilts well above the floodplain elevation.

Because the entire beach area on Patrick AFB (i.e., all land east of SR A1A) is within the 100-year floodplain, there is no practicable alternative to constructing the beach cottages within the floodplain and meeting the purpose and need for the proposed project. The fill would result in a negligible increase in the floodplain elevation, and the retention basins would provide compensatory storage. Therefore, impacts to the 100-year floodplain would be less than significant.

4.3.1.5 Coastal Zone Management Act Consistency

Based upon the statement in Appendix B, the USAF has determined that the Proposed Action is consistent with the CZMA. The Florida State Clearinghouse concurred that the Proposed Action is consistent with the FCMP in a letter dated 07 October 2019. As such, impacts associated with Coastal Zone Management Act Consistency would be considered less than significant.

4.3.2 Alternative 2 - Dual Connection to SR A1A

4.3.2.1 Surface Water

Impacts to surface water under this alternative would be similar but slightly less than those anticipated for Alternative 1. No significant impacts would be anticipated.

4.3.2.2 Water Quality

Impacts to water quality under this alternative would be similar but slightly less (due to less impervious surface) than those anticipated for Alternative 1. No significant impacts would be anticipated.

4.3.2.3 Groundwater

Impacts to water quality under this alternative would be the same as those anticipated for Alternative 1. No impacts would be anticipated.

4.3.2.4 Floodplains

Impacts to water quality under this alternative would be similar but slightly less (due to less asphalt drive construction) than those anticipated for Alternative 1. No significant impacts would be anticipated.

4.3.2.5 Coastal Zone Management Act Consistency

Based upon the statement in Appendix B, the USAF has determined that the Proposed Action is consistent with the CZMA. The Florida State Clearinghouse concurred that the Proposed Action is consistent with the FCMP in a letter dated 07 October 2019. As such, impacts associated with Coastal Zone Management Act Consistency would be the same as for Alternative 1 and would be less than significant.

4.3.3 Alternative 3 - No Action

The No Action alternative would not result in impacts to water quality.

4.4 Biological / Natural Resources

As discussed in the sections below, implementation of either of the action alternatives would result in less than significant short-and long-term impacts to Biological Resources. However, the adherence to conservation measures would be required to ensure that impacts to threatened, endangered, and sensitive species do not reach the threshold of significance.

4.4.1 Alternative 1 - Single Connection to SR A1A (Preferred Alternative)

4.4.1.1 Vegetation and Wildlife

Implementation of Alternative 1 would result in negligible, less than significant, short- and long-term direct impacts on vegetation and wildlife. Short-term impacts would occur during site preparation and construction. Once construction is complete, long-term impacts would result from site development. These impacts would be caused by the loss of vegetation and minor grading (approximately 0.2 acres) on the backside of the foredunes to stabilize them. However, the site currently provides very limited vegetative diversity and offers very little in the form of wildlife habitat. The grading and removal of sea grapes on the dunes would be limited to the extent required to allow construction equipment to maneuver around the building site to construct the back porches and stairs and stabilize the foredunes (Figure 6). Removal of the western edge of the dune vegetation would create a temporary reduction in light-shielding, but the vegetation should fill in with edge effect density within one growing season. The change from dense dune vegetation to an open sand environment resulting from boardwalk construction would change predation dynamics of insects and small reptiles, but the impact will not be significant due to the small areas of vegetation removal. Therefore, impacts to wildlife and vegetation would be less than significant.

4.4.1.2 Wetlands

There are no wetlands on or adjacent to the Proposed Action site; therefore, no impacts to this resource would be anticipated under Alternative 1.

4.4.1.3 Threatened, Endangered, and Sensitive Species

The Proposed Action site for beach cottage and dune crossover construction does not provide suitable habitat for threatened, endangered, and sensitive species. Therefore, the USAF has made a *No Effect* determination for the following species: piping plover, wood stork, smalltooth sawfish, American alligator, eastern indigo snake, North Atlantic right whale, sei whale, finback whale, humpback whale, and Florida manatee.

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1216 Figure 6. Proposed Action: Alternative 1 65% Design (Preferred Alternative)

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However, the adjacent beaches provide nesting habitat for federally protected sea turtles (loggerhead, green, leatherback, Kemp's ridley, and hawksbill). Information from the FWC notes that Brevard County's 2018 nesting season resulted in 23,294 loggerheads, 1,598 greens and 38 leatherback nests. Patrick AFB has an active sea turtle nest monitoring program that is conducted with close regulatory agency coordination. Patrick AFB beaches average from 700-1,600 sea turtle nests per year and constitute a large part of Brevard County's nesting beaches. Installation beaches received 1,330 sea turtle nests in 2018.

Direct impacts to sea turtle nesting habitat are not anticipated. The dune crossovers will terminate along the east face of the dune and will comply with FDEP standards to reduce beach impacts. However, direct effects due to lighting essential for human safety and national security at Patrick AFB may result in adverse effects to sea turtles. Research has demonstrated that artificial light sources can cause problems for sea turtles if the light source can be seen anywhere on the beach (Witherington and Martin 1996). Likewise, research suggests natural hatchling dispersal patterns may be disrupted by artificial lighting glow from lighted coastal areas, and disorientation (loss of bearing) can cause hatchling mortality, as the confused hatchlings move towards artificial light sources and dunes instead of the ocean (Witherington 1991). The USFWS issued a Biological Opinion (BO) to the 45th SW in 2008 (FWS 41910-2009-F-0087) that addresses light management on the installation. The USAF will develop a project specific light management plan (LMP) for this Proposed Action and submit to USFWS once the photometrics, light fixtures and glass tinting are finalized; it will adhere to the BO requirements and comply with 45th SW Instruction 32-7001, *Exterior Lighting Management* (23 April 2018) (Appendix C). In compliance with the USAF BO, 45 SWI 32-7001, and recommendations from USFWS to effectively reduce the potential for "take" of sea turtles, the measures that shall be implemented for this project include:

- A project-specific LMP detailing management of interior and exterior lighting associated with the beach cottages, to include design elements integrated to reduce lighting sky glow and direct visibility of artificial lighting on the beach, will be submitted to USFWS for review and approval prior to final signoff on the project or fixture purchase;

- Use of full cutoff limited wavelength amber LED exterior fixtures (FWC approved or meeting FWC specifications), tint of 45% visual light transmittance (VLT) or less on all glass (windows/doors) in line of sight of the beach with blackout curtains (plantation shutters only if approved by USFWS) or 15% VLT tint (all tint with less than 10% exterior reflectance);

- No construction activities behind the dune outside of daylight hours during the sea turtle nesting season (01 May-31 October) unless a separate construction LMP is approved by USFWS well in advance of proposed construction. No construction on the dune (crossovers) during sea turtle season; and

- Dune vegetation will only be removed for perpendicular paths for new dune crossover construction and some limited removal on the back side of the dune (west) to accommodate the beach cottage stairwells and decks.

Because the USAF will adhere to these measures, it finds that the proposed action is not likely to adversely affect the federally-threatened loggerhead and green sea turtles and endangered leatherback sea turtle. Any sea turtle "take" would be within the parameters of the 2008 BO, and there would be less than significant impacts to threatened, endangered, and sensitive species. The USFWS concurred with this determination on 08 October 2019 (Appendix A).

4.4.1.4 Migratory Birds

Site preparation activities at the Proposed Action site could result in minor impacts to bird species protected under the Migratory Bird Treaty Act by cutting down trees and clearing mowed areas that provide nesting habitat. Impacts to migratory birds would be minimized to insignificant levels by conducting surveys for migratory bird nests prior to clearing and grubbing and marking nest areas to avoid destruction of nests. Once clearing and grubbing have occurred, impacts to migratory birds are unlikely. The taking of adult migratory birds during construction is highly unlikely, because they are mobile and have sufficient nearby habitat to which they can relocate. Once constructed, the increased beach use and human presence could have a localized negative effect on loafing, foraging, and nesting or migratory birds. However, due to the localized nature of the beach use these impacts would not be significant. Therefore, implementation of the Proposed Action would have no significant impact on migratory birds.

4.4.2 Alternative 2 - Dual Connection to SR A1A

4.4.2.1 Vegetation and Wildlife

Impacts to vegetation and wildlife under this alternative would be similar but slightly less (due to less conversion of turf grass to asphalt drive) than those anticipated for Alternative 1. Dune vegetation removal and grading of the foredunes would be the same as for Alternative 1. No significant impacts would be anticipated.

4.4.2.2 Threatened, Endangered, and Sensitive Species

Impacts to threatened, endangered, and sensitive species would be the same as described for Alternative 1.

4.4.2.3 Wetlands

There are no wetlands on or adjacent to the Proposed Action site; therefore, no impacts to this resource would be anticipated under Alternative 2.

4.4.2.4 Threatened, Endangered, and Sensitive Species

Impacts to threatened, endangered, and sensitive species would be the same as described for Alternative 1.

4.4.2.5 Migratory Birds

Impacts to migratory birds under this alternative would be similar but slightly less (due to less conversion of turf grass to asphalt drive) than those anticipated for Alternative 1. No significant impacts would be anticipated.

4.4.3 No Action

There would be negligible impacts to Natural / Biological Resources under the No Action Alternative. The existing beach cottages have been retrofitted with lighting and shielding to comply with the 2008 BO.

4.5 Cultural Resources

Patrick AFB initiated consultation with the SHPO on 29 April 2019. The initial letter requested that the SHPO concur with Patrick AFB's delineation of the APE for the Proposed Action and finding of *No Historic Properties Affected*. In the SHPO's response on 09 May 2019, they determined that the proposed project will have no effect on historic properties listed, or eligible for listing, on the NRHP (Appendix A).

The three federally recognized tribes have stated they are only interested in proposed undertakings that involve Native American sites or cultural remains. Because there is no potential for prehistoric Native American cultural remains on the project site the USAF has determined that government-to-government consultation for this Proposed Action is not warranted.

4.5.1 Alternative 1 - Single Connection to SR A1A (Preferred Alternative)

If any Native American human remains or other archaeological resources are encountered during any kind of excavation associated with Alternative 1, excavation would stop and the base cultural resources manager would be notified immediately. A list of points of contacts can be found in the Patrick AFB ICRMP (USAF 2016b). The base cultural resources manager would follow the procedures in the Unplanned/Unanticipated Events SOPs for notification of the SHPO and appropriate Native American Tribes, Miccosukee and Seminole.

Based on the fact that the no NRHP-eligible buildings or archaeological sites were identified on the Proposed Action site, the SHPO's determination that implementation of the Proposed Action would not affect historic properties, and the SOPs in place, there would be no impacts to cultural resources expected under this alternative.

4.5.2 Alternative 2 – Dual Connection to SR A1A

Implementation of Alternative 2 would impact the same areas as Alternative 1. Therefore, no impacts to cultural resources would be expected.

4.5.3 Alternative 3 — No-Action

No impacts to cultural resources would occur under the No-Action Alternative.

4.6 Occupational Safety and Health

There would be no significant impacts to worker safety from implementation of any of the alternatives. The Patrick AFB fire station is less than three miles south of the Proposed Action site and the Cocoa Beach Fire Department is just over three miles to the north. In the unlikely event that emergency services are required response times would be acceptable.

4.6.1 Alternative 1 - Single Connection to SR A1A (Preferred Alternative)

Adherence to OSHA construction industry standards would greatly minimize the risk of worker injury during construction of Alternative 1 components. Construction traffic would be addressed in a USAF-approved Traffic Management Plan. No significant impacts to safety and occupational health would be anticipated.

4.6.2 Alternative 2 – Dual Connection to SR A1A

Adherence to OSHA construction industry standards would greatly minimize the risk of worker injury during construction of Alternative 2 components. As in Alternative 1, construction traffic would be addressed in a USAF-approved Traffic Management Plan. No significant impacts to safety and occupational health would be anticipated.

4.6.3 Alternative 3 — No-Action

There would be no construction of beach houses under the No Action Alternative, so no impacts to workers would be expected.

4.7 Other NEPA Considerations

4.7.1 Unavoidable Adverse Effects

Unavoidable adverse effects include those effects that cannot be avoided due to constraints in alternatives. Because both action alternatives would be sited immediately adjacent to the beach cottages, certain impacts are unavoidable. These include minimal impacts to threatened, endangered, and sensitive species and the 100-year floodplain. Impacts to these resources have been minimized to the extent practicable.

4.7.2 Relationships of Short-Term Uses and Long-Term Productivity

The Proposed Action would take advantage of existing infrastructure to the maximum extent possible. Once constructed, the beach cottages would provide MWR benefits to military personnel and DoD civilian employees for decades.

4.7.3 Irreversible and Irretrievable Commitments of Resources

Under the Proposed Action, irretrievable commitments of resources would occur from the negligible consumptive use of fuel, steel, concrete, and building materials during construction operations. The Proposed Action would result in the conversion of undeveloped beachfront to cottages and associated infrastructure.

4.8 Cumulative Effects

In accordance with CEQ NEPA implementation regulations (CEQ 1997), any past, present, and reasonably foreseeable future actions with the potential to cumulatively affect the same resources as the alternatives presented in Section 2 are presented below, followed by an analysis of cumulative effects. Future actions proposed in the area may require site-specific NEPA analysis prior to implementation.

Cumulative effects on environmental resources result from incremental impacts of an action, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Cumulative effects can result from minor, but collectively substantial, actions undertaken over time by various agencies (i.e., federal, state, and local) or individuals.

Past actions are those that occurred within the same geographic scope of cumulative effects that have shaped the current environmental conditions of the Project Area. Patrick AFB was constructed in 1940 as the Naval Air Station Banana River, and the three beach cottages adjacent to the Proposed Action site

were constructed in 1941. The beachfront at the southern end of Cocoa Beach has been developed for decades. Generally, past actions have shaped the resources to become the existing conditions described in Section 3.

Two projects that had an effect on the beaches within the vicinity of the Proposed Action area have occurred over the past 5 years, and are expected to continue into the foreseeable future and through implementation of the Alternative 1. Previous shoreline stabilization projects have been implemented along the Banana River, including the installation of gabion baskets in 2001 and 2009 to protect the Family Camping "Fam Camp" facility at Patrick AFB as well as the glide slope west of Runway 03/21. Another shoreline stabilization project on the Banana River is currently underway in the vicinity of Runway 11 and Rescue Road, approximately two miles southwest of the Proposed Action site (USAF 2017). However, none of these past actions would be anticipated to affect or otherwise interact with the Proposed Action.

A beach restoration and stabilization project was initiated in 2012 to repair post-2005 hurricane damage. The project included replacing approximately 310,000 cubic yards of sand to Patrick AFB beaches and revegetating dunes with native vegetation (the beaches adjacent to the Proposed Action site were included in this project). This effort had a beneficial effect on sea turtle nesting habitat and general beach conditions.

The Tides Collocated Club, a beachfront event venue on Patrick AFB located approximately 2.8 miles south of the Proposed Action site, was severely damaged by Hurricane Irma in September 2017. The USAF decided to repair the structure by replacement. Construction is currently underway and a Light Management Plan has been submitted to the USFWS. No lighting will be installed on the building deck until the plan is approved. Once the Light Management Plan is approved by the USFWS the lighting will be installed, and would not result in significant impacts to sea turtle nesting.

Implementation of the Proposed Action would result in an increase in human activity on the section of beach near the cottages. This activity (e.g., staking umbrellas, digging in the sand) has the potential to impact turtle nests and migratory shore birds loafing, foraging, and nesting as discussed in Sections 4.4.1.3 and 4.4.1.4, these impacts would be less than significant due to the small area affected and the adjacent stretch of beach to the south that is lightly utilized. No past, present, or future actions within the foreseeable planning horizon would involve coastline activities that would significantly impact beach conditions. Environmental effects identified in the analysis do not support a conclusion that there would be significant cumulative impacts as a result of increased beach activity or intrusive lighting that would occur under the Proposed Action. Cumulative impacts would therefore be less than significant.

4.9 Proposed Mitigation Measures

Mitigation measures would be required to avoid potentially significant impacts to federally-listed sea turtles (see Section 3.4.2.4) that could result from implementation of the Proposed Action. Mitigation would include the following:

- Patrick AFB would follow the terms and conditions of the 2008 BO, and all lighting would adhere to 45 SWI 32-7001 *Exterior Lighting Management* (Appendix C). A project-specific Light Management Plan would be developed to reduce the amount of exterior lighting visible from the beach. The Proposed Action would not be implemented until the plan is submitted to USFWS and approved.
- The USAF would continue surveys through sea turtle nesting season to report disorientation and lighting violations.

- No construction activities would be permitted between dusk and dawn.

These mitigation measures would minimize takings associated with the Proposed Action to levels within the parameters of the incidental take included in the 2008 BO.

5. LIST OF PREPARERS

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6. PERSONS AND AGENCIES CONSULTED/COORDINATED

Persons and agencies with whom the Air Force consulted to date as part of this EA include:

- The Florida SHPO,
- The USFWS, and
- The Florida State Clearinghouse.

Correspondence is included in Appendix A.

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7. REFERENCES

32 CFR 989, "Environmental Impact Analysis Process (EIAP)," *Code of Federal Regulations*.

36 CFR 800, "Protection of Historic Properties," *Code of Federal Regulations*.

40 CFR 1500–1508, Council on Environmental Quality (CEQ) implementing regulations, *Code of Federal Regulations*.

42 USC 4321 to 4370d, *United States Code*, National Environmental Policy Act (NEPA) of 1969.

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Appendix A

Correspondence and Consultation

- A-1. SHPO Consultation
- A-2. USFWS Consultation
- A-3. Notice of Availability and Public Comments and Agency Comments

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A-1. SHPO Consultation

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FLORIDA DEPARTMENT of STATE

RON DESANTIS
Governor

LAUREL M. LEE
Secretary of State

Michael Blaylock
Chief, Environmental Conservation
45 CES/CEIE-Cape
WP 321-853-0964 DSN 467-0964

May 9, 2019

RE: DHR Project File No.: 2019-2618, Received by DHR: April 29, 2019
Phase I Cultural Resources Assessment Survey of Three Historic Cottages on Patrick Air Force Base, Brevard County, Florida

To Whom It May Concern:

Our office received and reviewed the above referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places* (NRHP). The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties*.

In December 2018, the University of South Florida's (USF) Digital Heritage and Humanities Center (DHHC) conducted a cultural resources assessment survey (CRAS) on behalf of Rhodes + Brito Architects, Inc. This project was performed to comply with Section 106 of the National Historic Preservation Act (NHPA). Specifically, to determine if the development of base housing, and associated driveways, on Patrick Air Force Base (PAFB) property would impact any prehistoric or historic resources in the area of potential effect (APE).

The USF DHHC recorded one (1) resource group, 8BR3991, comprised of three (3) historic structures, 8BR3992 - 8BR3994, within the 6.2-acre APE during their investigation. USF DHHC recommended all structures and the resource group ineligible for NRHP listing due to commonality of design, non-historic alterations and additions, and lack of significant historic associations. Finally, they concluded that the proposed construction of additional base housing will have no adverse effect on the viewshed or historic fabric associated with any of the resources.

Based on the information provided, our office concurs with the NRHP-ineligible evaluations presented for resource group 8BR3991 and its contributing structures 8BR3992, 8BR3993, and 8BR3994. Our office further determined that the proposed project will have no effect on historic properties listed, or eligible for listing, on the NRHP. As with any ground disturbance project, if unmarked human remains are encountered during ground disturbing activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*. If I can be of any further help, or if you have questions about this letter, please feel free to contact Lindsay Rothrock at *Lindsay.Rothrock@dos.myflorida.com*.

Sincerely,

Timothy A. Parsons, Ph.D.
Director, Division of Historical Resources
and State Historic Preservation Officer

Division of Historical Resources
R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399
850.245.6300 • 850.245.6436 (Fax) • FLHeritage.com

Historical Resources

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A-3. USFWS Consultation

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From: Nguyen, Tina
Sent: Tuesday, October 8, 2019 1:55 PM
To: DATTILOBAIN, KEITHA M GS-12 USAF AFSPC 45 CES/CEIE
Subject: [Non-DoD Source] Re: [EXTERNAL] ESA Section 7 consultation for outdoor recreation beach cottages (final draft Environmental Assessment), PAFB, FL

Keitha,

The U.S. Fish and Wildlife Service (USFWS) has reviewed the Draft Environmental Assessment for the construction of Outdoor Recreation Beach Cottages at Patrick Air Force Base, Brevard County, FL. The Environmental Assessment (EA) was prepared to evaluate the potential environmental impacts of this proposed project in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), the USAF Environmental Impact Analysis Process (EIAP) Regulations at 32 CFR Part 989, and Air Force Instruction (AFI) 32-7061, The Environmental Impact Analysis Process.

The USFWS issued a Biological Opinion (BO) to the 45th 1235 SW in 2008 (FWS 41910-2009-F-0087) that addresses light management on the installation. The USAF will develop a project specific light management plan (LMP) for this Proposed Action and submit to USFWS once the photometrics, light fixtures and glass tinting are finalized; it will adhere to the BO requirements and comply with 45th SW Instruction 32-7001, Exterior Lighting Management (23 April 2018) (Appendix C). In compliance with the USAF BO, 45 SWI 32-7001, and recommendations from USFWS to effectively reduce the potential for "take" of sea turtles, the measures that shall be implemented for this project include:

- A project-specific LMP detailing management of interior and exterior lighting associated with the beach cottages, to include design elements integrated to reduce lighting sky glow and direct visibility of artificial lighting on the beach, will be submitted to USFWS for review and approval prior to final signoff on the project or fixture purchase;

- Use of full cutoff limited wavelength amber LED exterior fixtures (FWC approved or meeting FWC specifications), tint of 45% visual light transmittance (VLT) or less on all glass (windows/doors) in line of sight of the beach with blackout curtains (plantation shutters only if approved by USFWS) or 15% VLT tint (all tint with less than 10% exterior reflectance);

- No construction activities behind the dune outside of daylight hours during the sea turtle nesting season (01 May-31 October) unless a separate construction LMP is approved by USFWS well in advance of proposed construction. No construction on the dune (crossovers) during sea turtle season;

- Dune vegetation will only be removed for perpendicular paths for new dune crossover construction some limited removal on the back side of the dune (west) to accommodate the beach cottage stairwells and decks.

Because the USAF will adhere to these measures, it finds that the proposed action is not likely to adversely affect the federally-threatened loggerhead and green sea turtles and endangered leatherback sea turtle. Any sea turtle "take" would be within the parameters of the 2008 BO, and there would be less than significant impacts to threatened, endangered, and sensitive species. The USFWS concurs with this determination pending the final LMP be reviewed and approved by the USFWS for this project.

Best,
Tina

--
New projects should be submitted to: jaxregs@fws.gov

Tina Nguyen
Project Consultation
Fish and Wildlife Biologist
US Fish and Wildlife Service
North Florida Ecological Services Field Office
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256

https://www.fws.gov/northflorida/

1527 # A-3. Notice of Availability and Public and Agency Comments

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From:	Stahl, Chris
To:	JENNINGS, WILLIAM M GS-12 USAF AFSPC 45 CES/CEIE-C
Cc:	State_Clearinghouse
Subject:	[Non-DoD Source] State_Clearance_Letter_For_FL201908078711C_Draft Environmental Assessment for Outdoor Recreation Beach Cottages on Patrick Air Force Base, Brevard County, Florida
Date:	Monday, October 7, 2019 3:49:10 PM

October 7, 2019

William Jennings
United States Air Force
Patrick Air Force Base
Pactrick AFB, Florida 32925

RE: Department of Defense, Department of the Air Force, Draft Environmental Assessment for Outdoor Recreation Beach Cottages on Patrick Air Force Base, Brevard County, Florida
SAI # FL201908078711C

Dear William:

Florida State Clearinghouse staff has reviewed the proposal under the following authorities: Presidential Executive Order 12372; § 403.061(42), 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. §§ 4321-4347, as amended.

Staff of the Florida Department Of Transportation has noted that the proposed improvements are in an area where we have a proposed sidewalk project. Their consultant would like CADD files of the proposed improvements, if available. We would also like to be informed of the selected alternative, once the decision is made. Please contact Dill Romero at Romero.Dill@dot.state.fl.us for additional information.

If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, Florida Statutes. If you have any questions, please contact Rachel Thompson, Historic Sites Specialist, by email at Rachel.Thompson@dos.myflorida.com, or by telephone at 850.245.6453 or 800.847.7278.

Based on the information submitted and minimal project impacts, the state has no objections to the

subject project and, therefore, it is consistent with the Florida Coastal Management Program (FCMP). Thank you for the opportunity to review the proposed plan. If you have any questions or need further assistance, please don't hesitate to contact me at (850) 717-9076.

Sincerely,

Chris Stahl

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Blvd., M.S. 47
Tallahassee, FL 32399-2400
ph. (850) 717-9076
State.Clearinghouse@floridadep.gov

Appendix B

Coastal Zone Management Act Consistency Determination

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COASTAL ZONE MANAGEMENT ACT (CZMA) CONSISTENCY DETERMINATION

This consistency statement will examine the potential environmental consequences of the Proposed Action and ascertain the extent to which the consequences of the Proposed Action are consistent with the objectives of the Florida Coastal Management Program (FCMP).

The authority and enforceability of the FCMP is derived from 24 Florida Statutes. This consistency statement details how the Proposed Action is consistent with these 24 Florida Statutes and CMP objectives. Consistency is based on effects rather than geographic boundaries; consequently, there are no categorical exclusions from the consistency requirement. Any federal activity or federally-funded activity that would have an effect on a state's coastal zone is subject to a consistency review, unless specifically exempted by federal law. Effects are determined by assessing reasonably foreseeable direct and indirect effects on any coastal use or resource.

CONSISTENCY DETERMINATION

Chapter 161: Beach and Shore Preservation

The Proposed Action is to construct six outdoor recreation lodging units (three duplexes) immediately south of three existing units located east of SR A1A near the north end of Patrick Air Force Base (AFB) as presented in the 2019 Environmental Assessment (EA). These operations would occur within designated areas of Patrick Air Force Base (AFB). The units would be constructed behind the foredunes on level ground. Some vegetation (primarily sea grapes (*Coccoloba uvifer*a)) adjacent to and on the foredunes would be removed for construction of patios and two boardwalks. The landward edge of the foredunes would be graded to a 3:1 slope to stabilize them. Limited vegetation clearing with hand tools may be required to extend a path east to the beach from the proposed boardwalk. Dune vegetation removal would be minimized to the extent practicable. The boardwalks would be elevated to minimize impacts to the foredunes.

Other than the proposed elevated boardwalks, no part of the Proposed Action would involve construction, reconstruction, or other physical activities related to the beached and shores of the state and no eroding beaches would be adversely affected.

Chapter 163, Part II: Growth Policy, County and Municipal Planning; Land Development Regulation

The Proposed action would involve the construction of the six outdoor beach lodges behind the foredunes. The beach lodges would occur within an already established beachfront recreation area on access-restricted federal land and would be consistent with the existing and intended use of the land. The Proposed Action would to be consistent with local, regional, and state comprehensive plans and would not result in in land use conflicts.

Chapter 186: State and Regional Planning

The Proposed Action site is located in the Patrick AFB Ocean Planning District. This District serves as the primary center for community support for Patrick AFB, with facilities and activities supporting the daily lives of installation personnel, officers, Airmen, and their families. The Proposed Action is consistent with local, regional, and state comprehensive plans, and would not result in adverse impacts to land use compatibility.

Chapter 252: Emergency Management

Patrick AFB has one fire station that is located approximately 2.8 miles south of the Proposed Action site. The USAF is also party to reciprocal fire protection arrangements with fire protection in local communities and the fire department at Cape Canaveral Air Force Station. Fire hydrants are distributed around the installation and tied to the potable water supply system. Two fire hydrants are located east of SR A1A adjacent to the Proposed Action site. Fire flow capability is 1,000 gallons per minute at any single point. The Cocoa Beach Fire Department is located approximately 3.3 miles north of the Proposed Action site, and the Health First Cape Canaveral Hospital is located approximately six miles north. The Proposed Action is not anticipated to adversely affect emergency management.

Chapter 253: State Lands

The Proposed Action would not involve the sale, lease, or transfer of state lands. The construction would occur on Federally-owned land (i.e. Patrick AFB). The Proposed Action, as analyzed in the EA, would be expected to comply with all provisions of Chapter 253 of the Florida Statutes.

Chapter 258: State Parks and Preserves

The Proposed Action does not consist of and would not impact any state parks or preserves. Therefore, no adverse effects are expected.

Chapter 259: Land Acquisition for Conservation or Recreation

The Proposed Action site is located in the Patrick AFB Ocean Planning District. This District serves as the primary community support center for Patrick AFB, with facilities and activities supporting the daily lives of installation personnel, officers, Airmen, and their families. This planning district serves as the hub of support activities and includes administration, recreation opportunities, the Manatee Golf Course and Marina, Army and Air Force Exchange Service facilities, as well as privatized accompanied housing. The proposed beach cottages would be constructed on land designated as Privatized Accompanied Housing with Open Space. Therefore, the Proposed Action would not affect the current or future potential of land acquisition for conservation or recreation purposes.

Chapter 260: Florida Greenways and Trails Act

The Proposed Action would not adversely affect trails or public access to trails and would therefore comply with all provisions of Chapter 260 of the Florida Statutes.

Chapter 267: Historic Preservation

Implementation of the Proposed Action would not result in construction or ground disturbing activities that would have the potential to adversely impact subsurface cultural resource. A Phase I Cultural Resources Investigation was conducted by the University of South Florida in December 2018. The survey did not identify any National Register of Historic Places (NRHP) eligible archaeological sites or historic buildings within the Area of Potential Effect. The Florida SHPO concurred with the Air Force's *No Historic Properties Affected* determination on 09 May 2019. Therefore, the Proposed Action would not adversely affect historic preservation.

Chapter 288: Economic Development and Tourism

The Proposed Action would result in a slight increase in tourism, which would have a minor positive impact on key Florida's industries and economic diversification efforts. Rental of the beach cottages would be restricted to active and retired military personnel and DoD civilian employees.

Chapter 334: Transportation Administration

The additional traffic from the Proposed Action would be negligible relative to the 2017 Annual Average Daily Traffic (AADT) (i.e., the total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year) of 25,000 vehicles on this stretch of SR A1A. Therefore, the Proposed Action would not be expected to adversely affect the state's transportation administration, circulation, or organization.

Chapter 339: Transportation Finance and Planning

No changes to the transportation infrastructure or funds / funding would occur as a result of the Proposed Action. The Proposed Action would not be expected to have any effect on transportation finance or planning.

Chapter 370: Saltwater Living Resources

Direct impacts to sea turtle nesting habitat are not anticipated. The dune crossovers will terminate along the east face of the dune and will comply with FDEP standards to reduce beach impacts. However, direct effects due to lighting essential for human safety and national security at Patrick AFB may result in adverse effects to sea turtles. The USAF will develop a project specific light management plan (LMP) for this Proposed Action and submit to USFWS once the photometrics, light fixtures and glass tinting are finalized; it will adhere to the 2018 Biological Opinion (BO) requirements and comply with 45th SW Instruction 32-7001, *Exterior Lighting Management* (23 April 2018). In compliance with the USAF BO, 45 SWI 32-7001, and recommendations from USFWS to effectively reduce the potential for "take" of sea turtles, the measures that shall be implemented for this project are discussed in the EA. With continued incorporation of avoidance and impact minimization procedures and compliance with the 2008 BO, the USAF anticipates that the Proposed Action would result in no adverse effects to saltwater living resources.

Chapter 372: Living Land and Freshwater Resources

Threatened and endangered species, major plant communities, conservation of native habitat, and mitigation of potential impacts to the resources are addressed in the EA. The Proposed Action and Alternative Action would not result in permanent disturbance to native habitat and would not significantly impact threated or endangered species.

Chapter 373: Water Resource

The Proposed Action would not require or result in construction or ground disturbance that would potentially affect water resources. The EA addresses potential impacts to all water resources and determined that no substantial adverse impacts to water quality would result from the Proposed Action.

Chapter 375: Outdoor Recreation and Conservation Lands

Implementation of the Proposed Action would be consistent with Florida's Statewide Comprehensive Outdoor Recreation Plan.

Chapter 376: Pollutant Discharge Prevention and Removal

Construction activities required to implement the Proposed Action would include BMPs to minimize any pollutant discharges. Operation of the beach cottages would not result in pollutant discharges. Therefore, no adverse effect to pollution discharge would be expected.

Chapter 377: Energy Resources

The Proposed Action would not affect energy resource production, including oil and gas, and / or the transportation of oil and gas.

Chapter 379: Fish and Wildlife Conservation

Pursuant to the National Environmental Policy Act (NEPA) Sec 2, 102(H), avoidance and minimization of potential impacts to federal and state-protected species have been considered for the Proposed Action. Additional Best Management Practice (BMPs) have been adopted in order to avoid adverse effects to fish and / or wildlife. Therefore, the Proposed Action would be expected to remain consistent with the state's policies concerning the protection of wildlife.

Chapter 380: Land and Water Management

The Proposed Action would not be expected to result in adverse effects to upland habitats or surface waters. Land and water management issues are addressed appropriately in the EA. The Proposed Action would not occur in any designated areas of 'critical state concern'. Furthermore, the Proposed Action would not be expected to adversely affect any beach or shoreline areas, or lighthouses. The Proposed Action is expected to follow statewide guidelines and procedures outlined in Chapter 380 of the Florida Statutes.

Chapter 381: Public Health, General Provision

The Proposed Action would not affect the state's policies concerning the public health system.

Chapter 388: Mosquito Control

West Nile Virus and Encephalitis are major concerns for the 45th SW area. Public Health (PH) monitors the mosquito population through the use of light traps, CO_2 traps, and mosquito magnets. Once PH determines the counts are high enough, PH requests fogging operations. Currently, "BP-100" fogging concentrate with mineral oil is used to fog for adult mosquitoes.

The Proposed Action would require the construction of a dry retention pond system between the parking lot and Highway A1A to control stormwater. Based upon the design of the pond, it should not retain water for long enough to become a mosquito breeding ground. Therefore, the Proposed Action is not expected to increase risk to human development of the state, or prevent the enjoyment of its natural attractions by increasing the numbers of, or otherwise affecting, pestiferous and/or disease-carrying arthropods.

Chapter 403: Environmental Control

Pursuant to NEPA, this EA addresses the issues of conservation and protection of environmentally sensitive living resources; protection of groundwater and surface water quality and quantity; potable water supply; protection of air quality; minimization of adverse hydrogeological impacts; protection of endangered or threatened species; safety; solid, sanitary, and hazardous waste disposal; and protection of floodplains and wetlands. No substantial adverse effects or significant to these resources were identified; however, mitigation or conservation measures identified in the EA will be incorporated.

Chapter 583: Building and Construction Standards

All construction standards are addressed in the EA and consistent with Chapter 583 of the Florida Statutes.

Chapter 582: Soil and Water Conservation

Implementation of the Proposed Action would not require or result in any construction or ground disturbance that would potentially affect soil or water resources. No impacts to any contaminated sites are anticipated as they are not present on the site of the Proposed Action area. Therefore, the Proposed Action would not be expected to adversely affect soil and water conservation.

Chapter 597: Aquaculture

The Proposed Action is not anticipated to adversely affect the growth, development, or prosperity of local or state aquacultures. No aquaculture, shellfish production or harvesting, or any other related activity is included in the Proposed Action.

With continued incorporation of avoidance and impact minimization procedures, the construction of the outdoor beach cottages associated with the Proposed Action would result in no adverse effects, which are defined by Essential Fish Habitat (EFH) rules as “any impact which reduces quality and / or quantity of EFH… [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species’ fecundity) sire-specific or habitat-wide impacts including individual, cumulative, or synergistic consequences of actions.” Therefore, the Proposed Action not anticipated to diminish the potential for or quality of aquaculture.

CONCLUSION

The findings indicate that the Proposed Action, as presented in the EA is consistent with the FCMP.

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Appendix C

Light Management Plan

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BY ORDER OF THE COMMANDER
45TH SPACE WING

45TH SPACE WING INSTRUCTION
32-7001

23 APRIL 2018

Civil Engineering

EXTERIOR LIGHTING MANAGEMENT

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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RELEASABILITY: There are no releasability restrictions on this publication

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OPR: 45 CES/CEI

Certified by: 45 CES/CD
(John F. Faulkner)

Supersedes: 45SWI32-7001,
6 November 2012

Pages: 4

This instruction implements the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et seq), Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, and the United States Fish and Wildlife Service (USFWS) Biological Opinion issued 9 April 1991, updated 2 May 2000, 23 August 2006 and 18 November 2008. The instruction also explains management responsibilities, exterior lighting restrictions and reporting requirements necessary for the 45th Space Wing (45 SW) to remain in compliance with Federal, State and local standards. This publication applies to Patrick AFB, Cape Canaveral AFS, downrange sites and all units assigned to the 45th Space Wing. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, Management of Records, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication.* This publication may not be supplemented or further implemented/extended. Submit requests for waivers through the chain of command to the Publication OPR.

SUMMARY OF CHANGES

This publication has been substantially revised and must be completely reviewed. Major changes include removal of certain fixture types, addition of requirement to obtain fixture approval prior to purchase and installation, specifications for new and retrofitted fixtures' light wavelengths and the use of bollards, or other low mounted luminaries, for pathway lighting.

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1. Background. In 1998, the 45 SW and USFWS agreed to develop Light Management Plans (LMPs) in an effort to reduce the amount of exterior lighting visible from the beach. This action was required to reduce sea turtle hatchling mortality caused by disorientation. Disorientation occurs when sea turtles crawl toward inland light sources rather than the ocean. The LMPs identified exterior lights that could be replaced with low-pressure sodium (LPS) lamps, unnecessary lights that could be eliminated and operational constraints for all exterior lights. LPS was the most turtle friendly light technology at the time. Currently, LPS is being phased out and replaced with much more turtle friendly amber Light Emitting Diode (LED) lights. The USFWS has approved additional types of fixtures that may be used when shielded.

2. Concept. This instruction establishes responsibilities and provides guidance for the protection of threatened and endangered sea turtles in accordance with the ESA and the Biological Opinion issued by the USFWS. This instruction applies to all exterior lighting systems/fixtures located within Air Force property boundaries of the 45 SW that may affect sea turtles.

3. Responsibilities.

3.1. Organizations, tenants and residents are responsible for minimizing exterior lighting during the sea turtle nesting season, 1 May through 31 October, between the hours of 2100 and 0600. Exterior lighting that is not mission-, safety- or security-essential will be extinguished during this time frame. All exterior lights will be controlled by either individual or cluster light-specific switches, or an energy management control system.

3.1.1. The standard exterior lighting fixture is a downward-directed full cutoff amber LED. These LEDs must have a wavelength of 560 nanometers or longer, with no more than 1.75% of output shorter than 560 nanometers. All new exterior light fixtures and bulbs, including proposed mounting height, must be approved by 45th Civil Engineer Squadron, Installation Management Flight (45 CES/CEI) prior to purchase or installation, including new bulbs or fixtures anticipated for retrofitting or replacement. If mission, safety or security requirements cannot be met with amber LED lights, a letter of justification with the request for a variance must be submitted to the 45 CES/CEI for approval, along with a cut sheet of the fixture being requested. Existing lights may remain as installed until replacement is required; lights specifically shown to be causing sea turtle disorientation will need to be addressed immediately.

3.1.2. Walkway and/or pathway lighting shall consider the use of amber LED bollards and other low mounted luminaries as viable options and not limit design analyses to pole mount only. Shorter pole height shall also be considered especially in areas closer to the beach. In areas of rare to low vehicular and foot traffic during dark hours, utilization of dimmable luminaires shall also be considered to reduce the sky glow effect (light pollution). The number of bollards, luminaries or poles must be the minimum required to meet the lighting requirements.

3.1.3. Interior lighting that creates an incidental glow visible outside the facility with the potential to cause sea turtle disorientation must be extinguished or shielded to prevent the light from being visible external to the facility. Shielding can consist of baffles/louvers on the fixtures, sufficient tint on the windows that reduces light transmittance and/or curtain/blinds that adequately block the interior lighting. If interior lighting is required

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for safety or security reasons and is visible outside the facility, the facility manager must work with the 45 CES/CEI to identify alternative light types and shielding options.

3.1.4. Light Management Plans may be required for new facility construction/operation and/or any operations requiring exterior lighting. The need for a LMP will be determined by the 45 CES/CEI based upon potential impacts to sea turtles. It is the responsibility of the requester/user to complete and submit the LMP to the 45 CES/CEI, who will then submit to the USFWS for approval as required. Installation of lighting cannot commence until the LMP is approved in writing.

3.2. The 45 CES/CEI office will be responsible for monitoring and enforcement of light use restrictions for sea turtle protection on 45 SW installations.

4. Notification and Reporting.

4.1. The 45 CES/CEI office will issue annual notices to all personnel prior to the sea turtle nesting season to remind organizations, tenants and residents of light use constraints and responsibilities.

4.2. Incidents of inappropriate light operation will be reported to the accountable facility managers.

4.3. Questions regarding the requirements of this instruction or concerns related to sea turtles and lighting should be directed to 45 CES/CEI at (321) 853-6822 or (321) 853-0964.

WAYNE R. MONTEITH, Brigadier General, USAF
Commander

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

16 U.S.C. §1531 et seq, *Endangered Species Act of 1973*

AFPD 32-70, *Environmental Quality*, 20 July 1994

AFI 32-7064, *Integrated Natural Resources Management*, 18 November 2014

AFMAN 33-363, *Management of Records*, 1 March 2008

Light Management Biological Opinion, United States Fish and Wildlife Service, 18 November 2008

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

45 SW—45th Space Wing

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFRIMS—Air Force Records Information Management System

CCAFS—Cape Canaveral Air Force Station

DoD—Department of Defense

IAW—In accordance with

LED—Light Emitting Diode

LMP—Light Management Plan

LPS—Low Pressure Sodium

PAFB—Patrick Air Force Base

RDS—Records Disposition Schedule

SWI—Space Wing Instruction

U.S.C—United States Code

USFWS—United States Fish and Wildlife Service

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Appendix D

Air Emission Calculations

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