

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**Office of Commercial Space Transportation**

**RECORD OF DECISION**

**SpaceX Texas Launch Site, Cameron County, Texas**

**July 2014**

**Introduction and Background**

This Record of Decision (ROD) provides the Federal Aviation Administration's (FAA) final environmental determination and approval to support the issuance of launch licenses and/or experimental permits that would allow Space Exploration Technologies Corp. (SpaceX) to launch the Falcon 9 and Falcon Heavy orbital vertical launch vehicles and a variety of reusable suborbital launch vehicles from a launch site on privately owned property in Cameron County, Texas. The Federal action identified in this ROD is the FAA's issuance of launch licenses and/or experimental permits.

The ROD includes:

- Description of the project proposed by the applicant,
- Explanation of why there are no reasonable action alternatives to the proposed project,
- Environmental impacts associated with the Proposed Action,
- Potential mitigation measures that SpaceX will be required to implement as a condition of the issuance of the launch licenses and/or experimental permits, which are designed to avoid or minimize environmental harm, and
- The FAA's findings and determinations.

The ROD also discloses the Federal, State, and local actions needed before the project may be implemented and identifies the FAA's preferred and the environmentally preferable alternatives, and the alternative selected by the FAA for implementation.

The FAA published the Final Environmental Impact Statement (EIS) for the SpaceX Texas Launch Site on May 29, 2014, which is the primary reference and basis for preparation of this ROD. The Final EIS documents the analysis of environmental consequences associated with the construction and operation of the SpaceX Texas Launch Site and the No Action Alternative. The FAA is the lead Federal agency responsible for preparation of the EIS and ROD. Cooperating agencies include the National Aeronautics and Space Administration, National Park Service (NPS), U.S. Army White Sands Missile Range, and U.S. Army Corps of Engineers (USACE). The EIS and ROD were prepared pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969 as amended (42 United States Code [U.S.C.] 4321, et seq.), the Council on Environmental Quality

(CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures*.

The FAA is responsible for the accuracy of the information in the Final EIS and the ROD. For more information concerning the contents of this ROD or the Final EIS please contact:

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## **Project Purpose and Need**

### SpaceX Purpose and Need

SpaceX has proposed to construct and operate a private launch site to accommodate the number of launches that the company has on its launch manifest. The proposed private launch site is needed to provide SpaceX with an exclusive launch site that would allow the company to accommodate its launch manifest and meet tight launch windows. SpaceX intends to apply to the FAA for launch licenses and/or experimental permits to conduct launches of the Falcon Program vehicles, and a variety of reusable suborbital launch vehicles, for a total of up to 12 commercial launch operations per year from the proposed launch site on privately owned property in Cameron County, Texas. The FAA would likely issue launch specific licenses for the first few years of operation from the exclusive launch site. SpaceX may then apply for a launch operator license, which lasts for five years and covers the same family of vehicles.

### FAA Purpose and Need

The purpose of the FAA's Proposed Action—issuing launch licenses and/or experimental permits to SpaceX to conduct launches from the exclusive-use launch site in Cameron County, Texas—is to fulfill the FAA's responsibilities as authorized by Executive Order (EO) 12465 (*Commercial Expendable Launch Vehicle Activities*, 49 *Federal Register [FR]* 7099, 3 CFR, 1984 Comp., p. 163) and the Commercial Space Launch Act (51 U.S.C. Subtitle V, ch. 509 §§ 50901-50923) for oversight of commercial space launch activities, including issuing launch licenses and experimental permits to operate reusable orbital and suborbital launch vehicles. The Proposed Action would be consistent with the objectives of the Commercial Space Launch Act.

The need for the Proposed Action results from the statutory direction from Congress under the Commercial Space Launch Act to protect the public health and safety, safety of property, and national security and foreign policy interest of the United States and to encourage, facilitate, and promote commercial space launch and reentry activities by the private sector in order to

strengthen and expand U.S. space transportation infrastructure. The FAA expects to receive applications for launch licenses and/or experimental permits from SpaceX to conduct launches of the Falcon Program vehicles and a variety of reusable suborbital launch vehicles from the proposed launch site. The FAA must review each application and determine whether to issue the license or permit.

## **Overview of the Proposed Action and Alternatives**

The Proposed Action and alternatives considered are described in detail in Chapter 2 of the Final EIS and are summarized in this ROD.

### Proposed Action

The Proposed Action, which is the FAA's Preferred Alternative, is for the FAA to issue launch licenses and/or experimental permits to SpaceX that would allow SpaceX to conduct launches of the Falcon 9 and Falcon Heavy orbital vertical launch vehicles, and a variety of reusable suborbital launch vehicles, from an exclusive-use launch site on privately owned property in Cameron County, Texas. The site (including the control center area and vertical launch area) consists of up to four parcels totaling 68.9 acres of land near the terminus of State Highway 4 (Boca Chica Boulevard), adjacent to the village of Boca Chica. The site is in a sparsely populated coastal area on the Gulf of Mexico, approximately 3 miles north of the U.S./Mexico border, 17 miles east-northeast of the Brownsville/South Padre Island International Airport, and 5 miles south of South Padre Island.

### *Operations*

Proposed launch operations would consist of up to 12 commercial launch operations per year, including launches of the Falcon 9, a maximum of two Falcon Heavy launches, and/or associated mission rehearsals and static fire engine tests, through 2025.

Falcon 9 and Falcon Heavy launches would have commercial payloads, including satellites or experimental payloads, and may carry a capsule, such as the SpaceX Dragon capsule. The Falcon 9 and Falcon Heavy use liquid fuels including liquid oxygen and rocket propellant-1. Within the 12 launch operations per year, SpaceX may elect to have permitted launches of smaller reusable suborbital launch vehicles from this proposed site. A reusable suborbital launch vehicle could consist of a Falcon 9 Stage 1 tank. All launch trajectories would be to the east over the Gulf of Mexico. The majority of launches would be conducted between the hours of 7:00 a.m. and 7:00 p.m. However, there could be one nighttime launch per year. All launch operations, including pre-flight activities (e.g., mission rehearsals and static fire engine tests), would be conducted under the control of SpaceX and FAA, and in accordance with a Letter of Authorization from Houston Air Route Traffic Control Center.

Operational activities related to the Proposed Action include:

- Mission rehearsals and static fire engine tests
- Public notifications and Security Plan implementation

- Transport of launch vehicle to the launch pad
- Recovery of first and second stages

As part of the licensing and permitting process, SpaceX must implement a Security Plan that defines the process and notification timeline for ensuring that any unauthorized persons, vessels, trains, aircraft, or other vehicles are not within the FAA-approved hazard area. The Security Plan must include safety and security personnel for each launch operation and roadblocks and other security checkpoints for securing the closure area and limiting public access on the day of a launch operation.

SpaceX would limit public access at two pre-defined checkpoints, a soft checkpoint on State Highway 4, just west of the U.S. Customs and Border Protection checkpoint (approximately 14–16 miles west of the State Highway 4 terminus at Boca Chica Beach) where the general public could not pass, and a hard checkpoint, just west of the control center area, where no one would be permitted to pass during launch operations. The proposed closure area was developed in consultation with the U.S. Fish and Wildlife Service (USFWS) and the NPS due to the presence of the Lower Rio Grande Valley National Wildlife Refuge (NWR) and the Palmito Ranch Battlefield National Historic Landmark (NHL), which would both be included in the closure area to prevent potential public intrusion in these sensitive areas during launch operations. Boca Chica Beach would be closed to the public from the Brownsville Shipping Channel (excluded from the closure area) south to the U.S./Mexico border on the Gulf Coast. Offshore areas would be cleared by the U.S. Coast Guard (USCG) through issuing of Notices to Mariners and possible boat patrols.

The closures would last up to 15 hours on a launch day, with 6 hours being the typical closure time for a nominal launch. The 15-hour closure period allows for potential aborts and contingencies. A closure for a wet dress rehearsal or static fire engine test would be shorter than a closure for a launch. Closures for a wet dress rehearsal or static fire engine test would typically be 3 hours or less. The total number of closures and closure hours for wet dress rehearsals, static fire engine tests, and actual launches would fall within SpaceX's proposed 12 launch operations per year or annual maximum of 180 hours of closure per year.

Monitoring of the closure area would be done by vehicle along existing roads including State Highway 4, as well as by video surveillance. Only in the case that video surveillance is insufficient would other monitoring methods be used, such as, unmanned aerial surveillance, one fixed-wing aircraft, beach sweeps by all-terrain or sport utility vehicle, and/or USCG vessel.

Approximately 30 full-time SpaceX employees/contractors would be present on-site at the vertical launch area and/or control center area in 2016. By 2025, it is expected there would be 150 full-time SpaceX employees/contractors working on-site.

### *Construction*

SpaceX would construct a vertical launch area and a control center area. The control center area would be approximately 2 miles west of the vertical launch area and could consist of up to three parcels. All facilities would be constructed through private funding, on currently undeveloped, privately-owned property that would be purchased or leased by SpaceX. In addition, a new

underground utility line would be installed in the right-of-way of State Highway 4 from the control center area to the vertical launch area.

Facility and infrastructure construction at the vertical launch area (one parcel) would include the following:

- Integration and Processing Hangar
- Launch pad and stand with its associated flame duct
- Water tower for deluge water system (sound and vibration suppression; fire protection)
- Retention basin for deluge water
- Lightning protection towers (four total)
- Propellant storage and handling areas
- Workshop and office area
- Warehouse for parts storage
- Roads, parking areas, fencing, security, lighting, and utilities

Facility and infrastructure construction at the control center area would include the following:

- Two launch control center buildings
- Two payload processing facilities
- Launch vehicle processing hangar
- Two Radio Frequency transmitter/receivers
- Generators and diesel storage facilities
- Roads, parking areas, fencing, security, lighting, and utilities
- A satellite fuels and gas storage facility

#### Alternatives to the Proposed Action

In accordance with the Federal guidelines implementing NEPA, the FAA identified a range of reasonable alternatives. The scope of alternatives the FAA considered derives from the actions proposed by SpaceX and the need for and purpose of the Federal action in connection with SpaceX's proposal. The alternatives identified that did not meet the purpose and need as well as those that were not technically, operationally, or economically prudent or feasible were excluded from detailed consideration in the Final EIS. The Final EIS provides a detailed evaluation of the Proposed Action (Preferred Alternative) and the No Action Alternative.

SpaceX developed evaluation factors (criteria) that were applied to potential alternative locations for operation of the Falcon 9 and Falcon Heavy launch vehicle program. The criteria included latitude, trajectory, safety (population, isolation, and national security), accessibility, size, schedule flexibility, political stability, construction availability, airspace, privately owned site, environmental impact, locational diversity compared with other launch sites, and site configuration (see Section 2.3 of the Final EIS for a description of these factors). With these factors in mind, alternative sites were examined by SpaceX in its planning process. The alternatives SpaceX considered but did not carry forward are listed below. The specific reasons those sites were found to be infeasible are described in Section 2.3.1 of the Final EIS.

### *No Action Alternative*

Under the No Action Alternative, the FAA would not issue launch licenses and/or experimental permits to SpaceX for launch operations from the private site in Cameron County, Texas. Thus, SpaceX would not construct the proposed control center and vertical launch areas. For those parcels of land that SpaceX owns or leases, SpaceX could use the land at its discretion, in compliance with all applicable Federal, State, and local laws and regulations. The FAA is not aware of any defined SpaceX plans to develop the parcels of land that it owns or leases, if the FAA does not issue the launch licenses and/or experimental permits as described above. For the No Action Alternative, it is assumed SpaceX would leave the property undeveloped for the foreseeable future.

### *Alternatives Considered But Not Carried Forward for Detailed Evaluation*

*Off-site Alternatives:* SpaceX considered sites in Puerto Rico, Florida, and Texas (City of McGregor, Kenedy County, Willacy County, and other properties in Cameron County). None of the alternative sites sufficiently met SpaceX's criteria; therefore, they were not evaluated in detail in the EIS.

*On-site Alternatives:* Two alternative site layouts were analyzed on the proposed Cameron County site. The layout alternatives consisted of variable facility configurations that would be practicable and reduce impacts to wetlands.

- On-Site Layout Alternative 1 was the most optimal for SpaceX because it allowed the Hangar and the pad to be at the approximate north-south midpoint of the property. This site layout also allowed for ample separation from State Highway 4, which would be helpful for both site security reasons and to allow longer access roads that enable easier launch vehicle transport and integration. This layout was dismissed because it was estimated to directly impact approximately 5.79 acres of wetlands.
- On-Site Layout Alternative 2 was the second most optimal for SpaceX from a launch perspective. However, this layout was also dismissed due to the potential for direct impact to approximately 4.02 acres of wetlands.

### **Summary of Necessary Permits and Approvals**

Preparation of an EIS, public review and comment, and issuance of this ROD fulfills the FAA's requirements under NEPA. The FAA has selected the Preferred Alternative, which is for the FAA to issue launch licenses and/or experimental permits to SpaceX to conduct launches of the Falcon Program vehicles and a variety of reusable suborbital launch vehicles from the proposed launch site. The requirements for obtaining and possessing a launch license and/or experimental permit are described in 14 CFR Parts 400-450. The completion of the environmental review process does not guarantee that the FAA would issue launch licenses and/or experimental permits to SpaceX to launch from the proposed privately owned site in Cameron County, Texas. The Proposed Action must also meet FAA safety, risk, and indemnification requirements. As part of the licensing process, SpaceX also would need to obtain a Letter of Authorization from the Houston Air Route Traffic Control Center to operate the Falcon Program vehicles in the proposed airspace before any

launches could commence. SpaceX would also coordinate with the Secretariat of Communications and Transportation – Mexico regarding launch notifications.

Acquisition of permits and approvals under other regulations would be required prior to construction of the Texas Launch Site, including:

- Air quality permit(s) issued by the Texas Commission on Environmental Quality (TCEQ) for air emission sources (Texas Clean Air Act)
- Section 404 (Clean Water Act [CWA]) and Section 10 (Rivers and Harbors Act) permits issued by USACE for structures work and the discharge of dredge and/or fill of waters of the U.S. including wetlands
- Permits issued by the Texas General Land Office (TGLO) for coastal construction (Coastal Zone Management Act, Texas Open Beaches Act, and the Dune Protection Act)
- Texas Pollutant Discharge Elimination System permit issued by TCEQ for water pollutant discharges (CWA)
- Construction permit issued by Cameron County for construction in the floodplain (EO 11988, DOT Order 5650.2, and the National Flood Insurance Program)
- Utility permits issued by the Texas Department of Transportation for installation of utility lines
- Permit issued by the Cameron County Department of Health and Human Services for the design and operation of a septic system

The USFWS, through consultation under Section 7 of the Endangered Species Act (ESA), issued a Biological and Conference Opinion (BCO) on December 18, 2013 stating that the proposed project is not likely to jeopardize the continued existence of any federally listed or proposed to be listed species nor adversely modify critical habitat. The BCO specifies non-discretionary Terms and Conditions, which implement Reasonable and Prudent Measures, as well as discretionary Conservation Recommendations.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), the FAA has developed a Programmatic Agreement to resolve the adverse effects of the proposed project on historic properties. The Programmatic Agreement was signed by the FAA, Texas State Historic Preservation Officer, NPS, Advisory Council on Historic Preservation, SpaceX, USFWS, and Texas Parks and Wildlife Department (TPWD), and is attached to this ROD (Attachment 1).

With regard to Department of Transportation Act of 1966 Section 4(f) properties, the USFWS and NPS did not concur with the FAA's determination that operation of the proposed vertical launch and control center areas would not constitute a constructive use; however, both agencies agreed to move forward with development of "measures to minimize harm" to the Section 4(f) properties, in consultation with the FAA and other consulting parties participating in the Section 106 process. The FAA considers these measures to be proposed mitigation measures. With respect to the Proposed Action, the FAA is ultimately solely responsible for Section 4(f) applicability and determinations.

### **Preferred Alternative**

In determining the Preferred Alternative, which is also the Selected Alternative, the FAA considered the economic and environmental impacts of the applicant's Proposed Action and the No Action Alternative. The FAA evaluated the environmental impacts of vertical launch and control center construction and operation in the Draft and Final EIS. Based on all of these considerations, the FAA determined that SpaceX's proposal, as modified to incorporate the avoidance, minimization, and mitigation measures described below and in Chapter 6 of the Final EIS, constitutes the FAA's Preferred Alternative. Adoption of this alternative will result in the construction and operation of a private launch site that is consistent with the purpose and need for the Proposed Action, while at the same time avoiding, minimizing, and mitigating the harm to the environment.

### **Environmentally Preferable Alternative**

The environmentally preferable alternative in the Final EIS is the No Action Alternative because there would be no new construction or operation of a vertical launch and control center at the proposed site. Continuation of the existing site conditions would result in few, if any, additional environmental impacts. However, the No Action Alternative is not the FAA's Preferred Alternative because it is not consistent with the purpose and need for action, including the FAA's statutory direction from Congress under the Commercial Space Launch Act to encourage, facilitate, and promote commercial space launch and reentry activities by the private sector in order to strengthen and expand U.S. space transportation infrastructure.

### **Public and Agency Involvement**

The FAA provided opportunities for the public to give input on the proposed project through the public scoping period held in May 2012, and again during the public comment period for the Draft EIS from April to June 2013. The FAA has also worked closely with the cooperating agencies and consulting agencies in the preparation of the EIS.

Scoping for the development of the EIS began with the publication of the Notice of Intent (NOI) in the *Federal Register* on April 10, 2012 (77 FR 21619-21620). In the NOI, the FAA invited the participation of Federal, State, and local agencies, Native American tribes, environmental groups, citizens, and other interested parties to assist in determining the scope and significant issues to be evaluated in the EIS. The NOI was published in area newspapers; flyers announcing the scoping meeting were posted in local libraries, gas stations, and within the surrounding communities; and notices were hand-delivered to the residents of Boca Chica Village. A public scoping meeting was held on May 15, 2012, from 5:00 p.m. to 8:00 p.m., at the International Technology, Education, and Commerce Center in Brownsville, Texas.

Public review and comment on the Draft EIS was initiated with publication of the Notice of Availability (NOA) in the *Federal Register* on April 19, 2013 (78 FR 23629-23630). The NOA described the Proposed Action, provided the public hearing date and time (May 7, 2013 from 5:00



p.m. to 8:00 p.m.), informed the public on how to obtain a copy of the Draft EIS, and initiated the public comment period. The FAA also announced the availability of the Draft EIS and the public hearing date in area newspapers. Flyers were posted in the local area to announce the NOA and comment period for the Draft EIS. Copies of the Draft EIS were distributed the week of April 8, 2013. The FAA sent notification letters, e-mails, and compact discs (CDs) containing the Draft EIS to individuals; Federal, State, and local agencies; elected officials; various interest groups that were part of the mailing list compiled during the scoping period; and American Indian tribes.

The Draft EIS 45-day public comment period was initiated with the NOA on April 19, 2013. At the request of Environmental Protection Agency (EPA) Region 6, the comment period was extended by 21 days until June 24, 2013 (78 FR 35067). The FAA held a formal public hearing in Brownsville, TX on May 7, 2013. Appendix A of the Final EIS contains the FAA's responses to comments submitted during the public comment period. The FAA responded to all substantive comments, and included in the Final EIS any necessary changes or edits resulting from the comments received.

The EPA issued an NOA for the Final EIS on June 6, 2014 (79 FR 32729). The FAA is issuing this ROD no sooner than 30 days after publication of the Final EIS in accordance with CEQ NEPA implementing regulations (40 CFR 1500-1508). An electronic version of the Final EIS was posted on the FAA website:

[http://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/environmental/nepa\\_docs/review/documents\\_progress/spacex\\_texas\\_launch\\_site\\_environmental\\_impact\\_statement/](http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/spacex_texas_launch_site_environmental_impact_statement/).

In addition, copies of the Final EIS were sent to persons and agencies on the distribution list. A paper copy and an electronic version of the Final EIS were available for review at Brownsville Public Library Main Branch, Southmost Branch Library, and University of Texas at Brownsville.

### **Summary of the Environmental Consequences of the Proposed Action (Preferred Alternative)**

The Final EIS analyzed the direct, indirect, and cumulative environmental impacts of constructing and operating a private launch site in Cameron County, Texas. There would be unavoidable, significant direct and indirect impacts related to land use compatibility, noise, light emissions and visual impacts, and floodplains. Nevertheless, all practicable means to minimize harm to these resources were considered. Resource areas that require avoidance and minimization measures to reduce impacts include Section 4(f) properties, historic properties, surface waters, groundwater, wetlands, special-status species, and hazardous materials. The Final EIS (Chapter 6) describes measures that would be implemented to avoid, minimize, and mitigate environmental impacts; these measures are summarized below in the *Mitigation Summary* section.

The following sections summarize the impact analysis for each resource area under the Preferred Alternative, including the cumulative impacts of the Preferred Alternative when added to other past, present, and reasonably foreseeable future actions.

#### Compatible Land Use (Including Farmlands and Coastal Resources)

Construction would change the land from undeveloped, private land to mixed-use private land. The change does not violate local land use ordinances; therefore, there would be no significant construction impacts related to compatible land use, including farmlands or coastal resources.

Operations would have significant impacts on land use compatibility as a result of increased personnel working on-site, traffic, and noise from operational activities and launches, particularly to Boca Chica Village (a residential area) and the surrounding parks, cultural resources, and NWR (considered sensitive noise receptors). Noise impacts to up to 35 households in Boca Chica Village would be considered significant during a nighttime launch of the Falcon 9 and Falcon Heavy.

Public access to Boca Chica Beach, Boca Chica State Park, Lower Rio Grande Valley NWR, and Brazos Island State Park would be closed for safety and security reasons during launch operations for up to 15 hours per launch; a maximum of 180 hours per year. As of May 24, 2013, House Bill 2623 was signed by Governor Rick Perry to amend the Texas Natural Resources Code Chapter 61 (Sec. 61.132) to allow for the TGLO and/or the Cameron County Commissioners Court to temporarily close a public beach and beach access for space flight activities, including launches.

When the potential impacts of past, present, and reasonably foreseeable future actions are combined with the Preferred Alternative, there would be cumulative impacts to land use. To the extent the potential compatible land use impacts from the proposed South Padre Island Second Access and Brownsville/South Padre Rail Line projects overlap with the Preferred Alternative's impacts, there would be cumulative impacts to land use within the surrounding communities. Since the Preferred Alternative would result in significant impacts related to land use compatibility (from operational noise), any cumulative land use compatibility impacts would be significant.

#### Section 4(f) Properties

The FAA determined that construction and operation of the vertical launch and control center areas would not result in a physical use or constructive use of a Section 4(f) property. The FAA determined that temporary closures of some Section 4(f) properties would not substantially reduce the use or enjoyment of the Section 4(f) properties, because impacts from closures during launches would be intermittent and temporary, and thus, would not constitute a constructive use of these properties.

The FAA documented its *de minimis* impact determination for the installation of power lines along State Highway 4 right-of-way to the USFWS in a letter dated December 23, 2013. The Texas Historical Commission (THC) concurred with the FAA's determination on April 22, 2013, and the TPWD concurred on April 17, 2013. The USFWS and NPS did not concur with the FAA's determination that construction of the proposed vertical launch and control center areas would not constitute a constructive use; however, both agencies agreed to move forward with development of "measures to minimize harm" to the Section 4(f) properties in consultation with the FAA and other consulting parties participating in the Section 106 process. With respect to the Preferred Alternative, the FAA is ultimately solely responsible for Section 4(f) applicability and

determinations.

Potential cumulative impacts on Section 4(f) properties would consist of minimal cumulative visual impact on the Palmito Ranch Battlefield NHL from the distant Wind Farm and North Edinburg-Loma Alta Transmission Line projects. These minimal impacts are not expected to result in substantial impairment of any Section 4(f) property. Therefore, potential cumulative impacts on Section 4(f) properties would not be significant.

### Noise

The threshold of significance applicable to noise is defined in FAA Order 1050.1E, Appendix A, Section 14, which states that:

“A significant noise impact would occur if analysis shows that the Preferred Alternative will cause noise sensitive areas to experience an increase in noise of Day-Night average sound level (DNL) 1.5 decibels (dB) or more at or above DNL 65 dB noise exposure when compared to the No Action Alternative for the same timeframe”.

The DNL is the sound level in A-weighted decibels averaged over a 24-hour period.

Intermittent construction noise would occur from proposed construction activities over 24 months at the vertical launch and control center areas. Construction would typically occur during normal working hours between 8:00 a.m. and 5:00 p.m., Monday through Friday.

Significant noise impacts to up to 35 households in Boca Chica Village would occur during a nighttime launch of the Falcon 9 and Falcon Heavy. Sonic booms generated by these launch events would impact the ocean surface 40 miles off the coast and would not be audible on land; therefore, sonic booms would not produce any significant impacts in the surrounding areas. Small increases in noise levels along State Highway 4 would be expected because of the operation of delivery trucks and other personnel vehicles. Significant impacts to community noise levels from proposed daily operations are not anticipated.

When the noise impacts of the Preferred Alternative are combined with potential noise impacts of the future Brownsville/South Padre Rail Line, there could be cumulative noise impacts. Since the Preferred Alternative’s operational noise impacts would be significant, any potential cumulative noise impacts occurring during a launch would be considered significant. Noise levels of the future rail line are not known at this time, but if the rail line project is found to result in a significant increase in ambient noise levels, then it is assumed appropriate noise abatement measures would be evaluated where practicable.

### Light Emissions and Visual Impacts

Construction activities would impact the visual environment of residents of Boca Chica Village and travelers on State Highway 4, but impacts would be intermittent, temporary, and minimized through SpaceX’s Lighting Management Plan to be approved by NPS and USFWS.

Operations of the vertical launch and control center areas would likely have a significant impact on visual resources along State Highway 4 and the Palmito Ranch Battlefield NHL. Nighttime launch operations, occurring only once per year, would result in considerably higher levels of light

emissions than those currently present from Boca Chica Village.

One future project, North Edinburg-Loma Alta Transmission Line, has the potential to have a visual impact on the Palmito Ranch Battlefield NHL that could be cumulative with the Preferred Alternative. Since the Preferred Alternative would result in significant impacts on visual resources, any cumulative visual impacts from the future project would be considered significant. However, sufficient information is not available at this time to determine the extent of the impacts.

#### Historical, Architectural, Archaeological, and Cultural Resources

Absent the mitigation measures discussed below, construction of the proposed vertical launch and control center areas would impact the historic integrity of the Palmito Ranch Battlefield NHL through visual impacts, including vertical construction of towers and lighting. The increased noise levels from the number of construction trucks may diminish the integrity of the quiet setting of the Palmito Ranch Battlefield NHL, which contributes to its significance. The increased noise levels would be short-term and temporary.

Operation of the proposed vertical launch and control center areas would have a significant increase in noise compared to current conditions. However, high levels of noise produced during each launch would occur only during actual launch events and for a few minutes for each launch. The quiet setting of the historic properties would persist at all other times. Therefore, auditory effects to historic properties would be short-term and temporary. Three historic properties within the 5-mile Area of Potential Effect (APE)—the Cypress Pilings, Palmetto Pilings, and Palmetto Pilings Historical Marker—may be physically damaged from vibrations caused by high noise levels from a Falcon vehicle launch. Small increases in noise levels along State Highway 4, the north boundary of the NHL, would be expected as a result of the operation of delivery trucks and personnel vehicles. Increased noise levels typically would be greatest during commuting hours, although these periods would be of relatively short duration. Therefore, noise from average daily operations traffic would not result in adverse effects to the setting of the NHL.

The Palmito Ranch Battlefield, the 1936 Centennial Marker for the Palmetto Pilings, the 1846 Cypress Pilings (41CF117.1), the 1865 Palmetto Pilings (no number), and the Pilings Camp Site (41CF117.2) would be impacted from secondary (induced) impacts as a result of increased vehicular traffic (i.e., fuel and water trucks) associated with the construction and operation of the facility, as well as increased foot traffic and vehicular traffic from an anticipated flux in visitors to the area.

Through Section 106 consultation, the FAA has developed a Programmatic Agreement to resolve the adverse effects of the proposed project on historic properties. The Programmatic Agreement was signed by the FAA, Texas State Historic Preservation Officer, NPS, Advisory Council on Historic Preservation, SpaceX, USFWS, and TPWD, and is attached to this ROD (Attachment 1). Stipulations of the Programmatic Agreement are discussed below in the *Mitigation Summary* section.

One reasonably foreseeable future action, the North Edinburg-Loma Alta Transmission Line, may have an adverse visual effect on the NHL, associated with proposed 145-foot tall structures required for the lines, which could be cumulative with the impacts of the Preferred Alternative.

Because the closest part of the transmission line (Loma Alta Substation) would be approximately 3 miles from the NHL within the existing industrial viewshed of its location along the north side of the Brownsville Ship Channel, there would likely only be a minor adverse visual effect. This impact may contribute minor cumulative impacts to the NHL. When the impacts of the Preferred Alternative are considered in conjunction with the impacts of the future action, the cumulative impacts to historic properties could likely be considered significant. The Section 106 Programmatic Agreement for the Preferred Alternative includes stipulations on the process for minimizing and mitigating adverse effects on historic properties that would minimize the potential cumulative impact.

#### Air Quality

Air emissions from both construction and operation of the proposed vertical launch and control center areas would not have significant impacts on air quality. The estimated emissions represent extremely small percentages of the Cameron County regional emissions and would not cause an exceedance of any National Ambient Air Quality Standards (NAAQS). Cameron County, which includes the proposed vertical launch area and control center area, is in attainment for all criteria air pollutants. Therefore, the Clean Air Act General Conformity Rule does not apply to this action.

The following past, present, or reasonably foreseeable future actions could contribute to temporary or permanent air emissions in the Cameron County region: La Plaza at Brownsville Multimodal Facility, Artisan at Port Isabel, South Padre Island Second Access, Wind Farm, Brownsville/South Padre Rail Line, Port of Brownsville LNG Facility, SH550 Toll Road, North Edinburg-Loma Alta Transmission Line, Tenaska Brownsville Generating Station, and the Brownsville Liquid Handling Facility. However, criteria pollutants associated with the Preferred Alternative's operational emissions, when combined with these other projects, would be unlikely to result in noncompliance with the NAAQS and therefore would not be significant.

#### Water Resources (Including Surface Waters, Groundwater, Wetlands, Floodplains, and Wild and Scenic Rivers)

The Final EIS estimated that construction would result in approximately 6.19 acres of wetland impacts including the direct impact to approximately 3.34 acres of wetlands and the indirect impact to approximately 2.85 acres of wetlands. SpaceX has been working with the USACE to obtain a Section 404 CWA individual permit, which has required additional efforts to avoid and minimize wetland impacts and has resulted in a reduction of potential wetland impacts to a total of 3.90 acres. SpaceX's compensatory mitigation plan proposes to preserve wetlands at a ratio of ten times the amount of wetlands impacted. In accordance with DOT Order 5660.1A, the FAA has determined there is no practicable alternative to construction in wetlands, and the Preferred Alternative includes all practicable measures to minimize harm to wetlands which may result from construction (refer to Section 2.3 of the Final EIS). Adverse impacts to surface water, groundwater resources, groundwater quality, and wetlands are expected to be less than significant with the implementation of appropriate minimization measures. There are no impacts to Wild and Scenic Rivers due to construction because the section of the Rio Grande deemed wild and scenic is over 400 miles west of the vertical launch and control center areas. The proposed

vertical launch and control center areas would be located entirely within the 100-year floodplain. Approximately 4.22 acres of floodplain Zone V10 would be filled in the proposed vertical launch area and approximately 4.37 acres of Zone A8 would be filled in the western portion of the vertical launch area. Approximately 12.4 acres of Zone A8 would be filled in the control center area. Based on the expected notable adverse impacts on some of the natural and beneficial floodplain values, the Preferred Alternative would result in a significant floodplain encroachment per DOT Order 5650.2.

Operation of the vertical launch and control center areas would not result in additional impacts to surface water, groundwater resources, groundwater quality, wetlands, or floodplains. A Stormwater Pollution Prevention Plan (SWPPP) would specify and implement the use of Best Management Practices (BMPs) during operation, which would prevent further impacts. Adherence to the Spill Prevention, Control, and Countermeasures Plan (SPCCP) and a Hazardous Materials Management Plan would reduce the potential for adverse impacts to water resources. There would be no impacts to Wild and Scenic Rivers, which are over 400 miles away from the project area.

Past, present and reasonable foreseeable future projects that could have potential impacts on water resources that may be cumulative with the Preferred Alternative include the South Padre Island Second Access, Wind Farm, Palmito Ranch Battlefield Viewing Platform, and the Port of Brownsville LNG Facility. Under the Preferred Alternative, there would be adverse impacts to surface waters, groundwater resources, groundwater quality, wetlands, and floodplains as a result of construction and operation. However, those impacts are expected to be less than significant with appropriate mitigation. It is anticipated that applications submitted for State and Federal permits for the other actions would also include evaluation of alternatives and avoidance and minimization measures to reduce potential impacts to water resources. In addition, appropriate wetland mitigation would be implemented to ensure no net loss of wetlands. Therefore, the cumulative impacts to water resources would not be significant.

#### Biological Resources (Fish, Wildlife, and Plants)

Construction of the proposed vertical launch and control center area facilities and infrastructure would remove approximately 15.74 acres of upland habitat and 3.34 acres of wetland habitat. The construction of buildings and roads at the vertical launch area would cut off the tidal influence to 2.85 acres of wetland. These indirect wetland impacts are comprised of 2.54 acres of high marsh vegetated wetlands and 0.31 acre of unvegetated wetland salt flats. These vegetation impacts would not be significant and would be further reduced by SpaceX's recent avoidance efforts, as noted above under *Water Resources*. Noise and human disturbance from construction activities may temporarily displace wildlife species from the project areas. However, it is expected that wildlife species would move to suitable habitat in the vicinity and would not be significantly impacted by short-term construction activities. In addition, with implementation of measures discussed below in the *Mitigation Summary* section, there would be no significant impacts to wildlife from proposed construction activities.

Daily operations would not include disturbance to vegetation; therefore, there would be no

significant impacts to vegetation with implementation of the Preferred Alternative. With implementation of measures discussed below in the *Mitigation Summary* section, operation of the vertical launch and control center area would have no significant impact on wildlife species (including state-listed wildlife species and migratory birds). In accordance with Section 7 of the ESA, the FAA prepared a Biological Assessment (BA) and entered into formal consultation with the USFWS to address potential impacts to ESA-listed species, species proposed for listing, and critical habitat. Based on the analysis presented in the BA, the FAA determined that the Preferred Alternative “may affect, is likely to adversely affect” the following species: piping plover and its critical habitat, red knot, northern aplomado falcon, Gulf Coast jaguarundi, ocelot, and Kemp’s ridley, hawksbill, leatherback, loggerhead, and green sea turtles. The FAA determined that the Preferred Alternative “may affect, is not likely to adversely” affect the West Indian manatee. Consultation with the USFWS was completed with their issuance of a Biological and Conference Opinion (BCO) on December 18, 2013. The BCO concurred with the findings of the BA analysis and concluded no jeopardy to any species and no adverse modification to designated piping plover critical habitat with construction and operations of the Preferred Alternative. The BCO specified non-discretionary Reasonable and Prudent Measures that are necessary to minimize impacts to listed species (i.e., amount or extent of incidental take) and critical habitat. The BCO also specified discretionary Conservation Recommendations that are intended to avoid or minimize adverse effects of a Preferred Alternative on listed species and critical habitat. The FAA commits to implementing the Reasonable and Prudent Measures and the Terms and Conditions outlined in the BCO to minimize potential impacts on ESA-listed species and critical habitat. These measures are discussed below in the *Mitigation Summary* section.

Reasonably foreseeable future projects (South Padre Island Second Access, Wind Farm, the Port of Brownsville LNG Facility, and STARGATE) have the potential to cause cumulative adverse impacts to special-status wildlife species and habitat, including the same species that may be affected under the Preferred Alternative. With implementation of Reasonable and Prudent Measures required by USFWS, there would be no significant impacts on wildlife species (including state-listed wildlife species and migratory birds) under the Preferred Alternative. Significant cumulative impacts to biological resources are not expected.

#### Hazardous Materials, Pollution Prevention, and Solid Waste

Construction activities would require the use of hazardous materials, such as diesel fuel, gasoline, and propane to fuel the construction equipment; hydraulic fluids, oils and lubricants; welding gases; paints; solvents; adhesives; and batteries. With implementation of appropriate handling and management procedures, hazardous materials, hazardous wastes, and solid wastes generated during the construction of the vertical launch and control center areas would limit the potential for impacts. Therefore, no significant impacts to the environment from hazardous materials, pollution, and solid waste are anticipated.

Operations at both the vertical launch and control center areas would use products containing hazardous materials, including paints, solvents, oils, lubricants, acids, batteries, surface coating, and cleaning compounds. Hazardous materials such as propellants, chemicals, and other hazardous material payload components would be transported to the facilities in accordance with

DOT regulations. Implementation of appropriate handling and management procedures for hazardous materials, hazardous wastes, and solid wastes generated during the operation of the vertical launch area (including launches) and control center area would limit the potential for impacts. Therefore, no significant impacts to the environment from hazardous materials, pollution, and solid waste are anticipated.

Of past, present, and reasonably foreseeable future projects, the SH550 Toll Road, North Edinburg-Loma Alta Transmission Line, Tenaska Brownsville Generating Station, and the Brownsville Liquid Handling Facility projects have the potential to result in hazardous materials or pollution impacts that may be cumulative with impacts of the Preferred Alternative. However, specific information is not available to further assess these potential impacts. Assuming laws and regulations are adhered to, and appropriate measures would be taken to avoid and minimize adverse impacts of these other actions, significant cumulative impacts are not expected.

#### Socioeconomics, Environmental Justice, and Children's Environmental Health Risks and Safety Risks

Construction would have a beneficial impact on the area economy through direct spending and would generate economic activity that would lead to indirect job creation in areas such as accommodation and food services and retail trade sectors. Construction activities would not be expected to result in significant impacts to the housing market. Additionally, the Preferred Alternative would not be expected to strain the capacity or affect the quality of emergency response, medical services, or public education services. Changes to the viewshed from State Highway 4 would affect all viewers equally and would not result in disproportionate impacts to environmental justice populations. The Preferred Alternative would not adversely affect children's environmental health and safety. Construction of the control center area would have adverse visual impacts on residents of Boca Chica Village.

Operational activities would not be expected to result in significant effects to the housing market or population in-migration. Population growth due to operations would not be expected to strain the capacity or affect the quality of emergency response, medical services, or public education. While effects on property values cannot be quantified, potential effects to quality of life for Boca Chica Village residents can be qualitatively described. Operations would change the noise environment, visual viewshed, nighttime light emissions, traffic, and numbers of people in the vicinity. These changes would affect how Boca Chica Village residents experience their neighborhood; however, this would not be considered a disproportionate impact to environmental justice populations, or to the environmental health and safety of children. Therefore, there are no significant environmental justice impacts or health impacts and safety risks to children, as defined by FAA Order 1050.1E, because significance thresholds are not expected to be reached.

Considering past, present, and reasonably foreseeable future projects, the Artisan at Port Isabel, SH550 Toll Road, South Padre Island Second Access, Wind Farm, the Port of Brownsville LNG Facility, North Edinburg-Loma Alta Transmission Line, Tenaska Brownsville Generating Station, and the Brownsville Liquid Handling Facility projects are all anticipated to result in positive



socioeconomic impacts to the area. These projects would likely generate construction jobs and permanent jobs along with associated spending that would benefit the economy. The Port of Brownsville and supporting trucking and shipping industries would likely benefit and contribute to the economy. These projects may result in new population with the potential to induce development that could have both beneficial impacts (jobs, tax revenue, and economic development) and adverse impacts (air quality and groundwater demand). The beneficial and adverse socioeconomic impacts of these projects within the area would be cumulative with the Preferred Alternative. Past, present, and reasonably foreseeable projects combined with the Preferred Alternative, would generate positive impacts to socioeconomics within the region, and there would be no impacts to children's environmental health and safety risks.

#### Natural Resources and Energy Supply

The energy required for construction activities would predominantly be associated with operating construction equipment and generators, which would require the supply of gasoline and diesel fuels. Construction may also have a minimal requirement for single-phase electrical power. No significant impact to the energy supply is anticipated as a result of construction. There would be a substantial requirement for aggregate (mineral materials such as sand and/or stone used in making concrete). It is anticipated the region surrounding Brownsville would have sufficient supply of aggregate to meet the requirements for the Preferred Alternative without impacting the availability for other uses in the area. The construction of the vertical launch and control center areas would not require significant quantities of groundwater. It is unlikely that the construction groundwater use would result in a significant impact in the region.

Operations of the proposed vertical launch and control center areas are estimated to have a total maximum electrical load of 3,000 kilowatts per hour. In addition to electricity, energy supply requirements for operations would include various propellant fuels, as well as diesel and gasoline to fuel the ground equipment necessary for launch operations. All propellants would be provided by regional or national suppliers and would be transported to the vertical launch and control center areas by truck. No significant impact to the energy supply is anticipated as a result of operations. Groundwater would be potentially used for two primary uses: the supply of the deluge water for each launch and for personnel use at the vertical launch and control center areas. No significant impacts to municipal water supply in Brownsville, or groundwater supply in Cameron County, would occur as a result of the Preferred Alternative.

When past, present, and reasonably foreseeable projects are analyzed in conjunction with the Preferred Alternative, there would be a cumulative increase in the demand for energy and natural resources within the surrounding communities. The cumulative increases in energy supply from the present and future energy supply projects would offset some of the cumulative demand. Therefore, the cumulative impacts would not be considered significant.

#### Secondary (Induced) Impacts

According to FAA Order 1050.1E, secondary or induced impacts are those impacts that are caused by the Preferred Alternative but occur later in time and/or farther removed in distance, but are

foreseeable. Types of potential secondary or induced impacts analyzed include, but are not limited to:

- Increased public service demands
- Changes in regional land use
- Changes to the regional economy
- Induced growth
- Shifts in population movement

Construction of the vertical launch and control center areas is anticipated to have temporary impacts on the regional economy; however, these would be short-term (approximately 24 months) and would not result in significant beneficial impacts to the economy. There would be no significant secondary impacts to public services.

The operation of the vertical launch and control center areas would result in temporary impacts to the local and regional economy during launch campaign periods due to increases in transient employees and visitors. There is the potential for secondary impacts to land use due to the potential for amenities such as hotels, restaurants, shopping, etc., which may be developed to accommodate the needs of employees and visitors during launches. However, there are no known future development activities that would be dependent on the Preferred Alternative. Under the Preferred Alternative, the operation of the vertical launch and control center areas is not anticipated to have significant secondary impacts to public services.

### **Findings and Determinations**

The FAA makes the following determinations for this project, based upon the appropriate information and analysis set forth in the FEIS and upon other portions of the administrative record:

- **49 U.S.C. §303(c) (Section 4(f)):** The FAA has determined that construction of the vertical launch and control areas, and operations, would not result in a physical or constructive use of a Section 4(f) property. The FAA concluded the underground installation of the power and data lines in State Highway 4 ROW would be a *de minimis* impact, as it would not adversely affect the activities, features, or attributes that qualify the NWR for protection under Section 4(f) (). Underground installation minimizes harm to the property, and areas of disturbance would be returned to a condition which is at least as good as that which existed prior to the installation. The FAA documented its *de minimis* impact determination for the installation of power lines along State Highway 4 ROW to the USFWS in a letter dated December 23, 2013. The FAA has determined that temporary closures of some Section 4(f) properties (due to launch operations) would not substantially reduce the use or enjoyment of the Section 4(f) properties, because impacts from closures during launches would be intermittent and temporary, and thus, would not constitute a constructive use of these properties. The THC concurred with the FAA's 4(f) determinations on April 22, 2013, and the TPWD concurred on April 17, 2013. The USFWS and NPS did not concur with the FAA's determination that construction of the proposed vertical launch and control center areas would not constitute a constructive use; however, both agencies agreed to move

forward with development of measures to minimize harm to the Section 4(f) properties in consultation with the FAA and other consulting parties participating in the Section 106 process.

- **National Historic Preservation Act of 1966 (16 U.S.C. § 470) (NHPA):** The FAA determined in consultation with the Section 106 consulting parties that, absent mitigation measures, the Preferred Alternative would adversely affect the following historic properties: Palmito Ranch Battlefield NHL, the 1936 Centennial Marker for the Palmetto Pilings (Marker), 1846 Cypress Pilings (41CF117.1), 1865 Palmetto Pilings (no number), and the Pilings Camp Site (41CF117.2). Through Section 106 consultation, the following parties have executed a Programmatic Agreement (PA) (attached as Attachment 1 to this ROD) to govern the implementation of a program for the resolution of adverse effects on historic properties: FAA, State Historic Preservation Officer, NPS, USFWS, TPWD, ACHP, and SpaceX. The PA was signed on May 30, 2014. Compliance with the procedures established in the PA will satisfy the FAA's Section 106 responsibilities. Pursuant to the PA, the FAA is in the process of developing a Memorandum of Agreement (MOA) with the Section 106 consulting parties for resolution of effects to the historic properties.
- **Clean Air Act of 1970 (42 U.S.C. § 7401 et seq.) (CAA):** The estimated emissions from construction and operation of the vertical launch and control enter areas represent extremely small percentages of the Cameron County regional emissions and would not cause an exceedance of any NAAQS.
- **Executive Order 11990, *Protection of Wetlands*:** The Preferred Alternative would result in approximately 6.19 acres of wetland impacts including: the direct impact to approximately 3.34 acres of wetlands and the indirect impact to approximately 2.85 acres of wetlands. SpaceX has been working with the USACE to obtain a Section 404 CWA individual permit, which has required additional efforts to avoid and minimize wetland impacts and has resulted in a reduction of potential wetland impacts to 3.90 acres. There is no practicable alternative to filling this wetland that would meet the purpose and need of the Preferred Alternative. SpaceX's compensatory mitigation plan proposes to preserve wetlands at a ratio of ten times the amount of wetlands impacted. Adverse impacts to wetlands are expected to be less than significant if appropriate mitigation measures are implemented. Accordingly, the FAA finds that the Preferred Action is in compliance with EO 11990.
- **Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) (ESA):** In accordance with Section 7 of the ESA, the FAA prepared a Biological Assessment (BA) and entered into formal consultation with the USFWS to address potential impacts to ESA-listed species, species proposed for listing, and critical habitat. Based on the analysis presented in the BA, the FAA determined that the Preferred Alternative "may affect, is likely to adversely affect" the following species: piping plover and its critical habitat, red knot, northern aplomado falcon, Gulf Coast jaguarundi, ocelot, and Kemp's ridley, hawksbill, leatherback, loggerhead, and green sea turtles. The FAA determined that the Preferred Alternative may affect, is not likely to adversely affect the West Indian manatee. Consultation with the USFWS was completed with their issuance of a BCO on December 18, 2013. The BCO concurred with the findings of the BA analysis and concluded no jeopardy to any species and no adverse

modification to designated piping plover critical habitat with construction and operations of the Preferred Alternative. The BCO specified non-discretionary Reasonable and Prudent Measures that are necessary to minimize impacts to listed species (i.e., amount or extent of incidental take) and critical habitat. The BCO also specified discretionary Conservation Recommendations that are intended to avoid or minimize adverse effects of a Preferred Alternative on listed species and critical habitat. The FAA commits to implementing the Reasonable and Prudent Measures and the Terms and Conditions outlined in the BCO to minimize potential impacts on ESA-listed species and critical habitat.

- **Migratory Bird Treaty Act of 1918 (16 U.S.C. § 703-712):** The FEIS documents the FAA's consideration of the potential for impacts to migratory birds. In accordance with the conclusion of formal consultation with the USFWS under Section 7 of the ESA, incidental take of any migratory bird protected under the MBTA is addressed under the terms and conditions specified in the BCO.
- **Executive Order 11988, Floodplain Management, and Department of Transportation Order 5650.2, Floodplains:** The proposed vertical launch and control center areas would be located entirely within the 100-year floodplain. Approximately 4.22 acres of floodplain Zone V10 would be filled in the proposed vertical launch area and approximately 4.37 acres of Zone A8 would be filled in the western portion of the vertical launch area. Approximately 12.4 acres of Zone A8 would be filled in the control center area. Based on the expected notable adverse impacts on some of the natural and beneficial floodplain values, the Preferred Alternative would result in a significant floodplain encroachment per DOT Order 5650.2. There is no practicable alternative that does not include construction in the floodplain and that would meet the purpose and need of the Preferred Alternative. As explained in Section 4.7.1, SpaceX will be required to comply with applicable local floodplain protection standards. In the event of a flood or storm event, SpaceX would implement flood control measures, which could include locating water-sensitive equipment, supplies, chemicals, etc. above flood level, and moving hazardous waste outside of the floodplain when substantial storms are imminent. The implementation of these measures would reduce the likelihood that a flood or storm event might result in loss of life, injury to persons, or damage to property or otherwise be considered a "critical action" as defined in EO 11988. Accordingly, the FAA finds that the Project is in compliance with EO 11988.
- **Coastal Zone Management Act (16 U.S.C. § 1451) (CZMA):** A Federal Consistency Review was prepared and submitted to the Texas General Land Office (TGLO) to assess compliance of the Preferred Action with the Texas Coastal Management Program. TGLO has raised no objections to the Federal Consistency Review and indicated in an email dated June 24, 2013 that it has no comments on the Federal Consistency Review. Based on this consultation, the FAA has determined the Preferred Alternative is consistent with the enforceable policies of the TCMP and in compliance with the CZMA.
- **Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; and Department of Transportation Order 5610.2, Environmental Justice in Minority and Low-Income Populations:** Construction

would result in changes to the viewshed that would affect all viewers equally, and would not result in disproportionate impacts to environmental justice populations. Operation of the Preferred Alternative would change the noise environment, visual viewshed, nighttime light emissions, traffic, and numbers of people in the vicinity. These changes would affect how Boca Chica Village residents experience their neighborhood; however, this would not be considered a disproportionate impact to environmental justice populations per EO 12898. In accordance with EO and DOT Order, the FAA provided opportunities for meaningful public involvement by minority and low income populations.

- **Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks.** The FAA has determined there will be no change in risk to health or safety for children caused by the Preferred Alternative.

The FAA has given this proposal the independent and objective evaluation required by the Council on Environmental Quality. [40 CFR 1506.5]

As outlined in the Final EIS, there was a lengthy process that led to the ultimate identification of the preferred alternative and appropriate mitigation measures. This process began through the FAA competitive selection of an independent EIS contractor which was financially-disinterested in the project outcome, and continued throughout the NEPA process. The FAA provided input, advice, and expertise throughout the planning and technical analysis, along with an administrative and legal review of the project. From its inception, the FAA has taken a strong leadership role in the environmental evaluation of this project, and has maintained its objectivity.

### **Mitigation Summary**

This section summarizes measures that SpaceX will implement to reduce or offset the potential environmental consequences of construction and operation of the proposed launch site. This section reflects the FAA's consideration of all practicable means to minimize harm to those resources that will be subject to unavoidable significant impacts, as well as avoidance and minimization measures to reduce impacts to other resources below significance thresholds. Measures described in the following sections include stipulations required by ESA Section 7 and NHPA Section 106 agency consultation, management plans and procedures, BMPs, and special conservation measures that will be implemented during construction and operation. Additional measures may be considered if required by future coordination with Federal and State agencies.

Development of the specific plans and other BMPs during the construction phase will be the responsibility of SpaceX, to be delegated to the contractor, as necessary, during construction of the vertical launch and control center areas. The contractor will be required to apply the current construction industry BMPs in accordance with Federal requirements, NPDES General Permit Requirements, and applicable regulations of the TCEQ. SpaceX will oversee all contractor performance to ensure that the contractor complies with these requirements.

In accordance with 40 CFR §1505.3, the FAA will take appropriate steps to ensure that the mitigation actions required as a condition of the approval of the action described in the Final EIS are implemented during project development. SpaceX will monitor the implementation of these mitigation actions. Reports of monitoring will provide necessary assurance that representations

made in the Final EIS with respect to mitigation are carried out. The issuance of any launch licenses and/or experimental permits to SpaceX will be conditioned upon SpaceX's demonstration that it has complied with required mitigation measures. As appropriate, the FAA may enter into an agreement with SpaceX to provide for annual environmental FAA inspections to ensure ongoing compliance with mitigation requirements. Mitigation actions related to SpaceX operations will be made the subject of the terms and conditions of the launch license(s) and/or experimental permit(s) issued to SpaceX.

The following sections provide a description of measures to avoid, minimize, or mitigate environmental impacts.

#### Compatible Land Use (Including Farmlands and Coastal Resources)

1. SpaceX would become a Beach Guardian in the Adopt-a-Beach Program organized by the TGLO. SpaceX would adopt a 3-mile portion of Boca Chica Beach centered on the terminus of State Highway 4. At a minimum, SpaceX will:
  - a. Participate in the two annual cleanups organized by the TGLO.
  - b. Organize a minimum of one additional cleanup of Boca Chica Beach. This additional cleanup will involve the community as much as possible and include features, paid for by SpaceX, such as:
    - i. Guest educational speakers to teach the community about topics such as the area's wildlife, the area's history, the sources of the debris on the beach, and how the cleanup benefits the beach. These speakers could come from several sources, including the Cameron County Parks and Recreation Department and the nearby universities.
  - c. Organize SpaceX personnel to teach the community about topics such as the space program, rocket engineering, and the site design characteristics that are intended to minimize environmental impact.
  - d. Complete monthly cleanups of the beach, focusing on large pieces of litter. During each cleanup, SpaceX will record information about trash collected on data cards provided by the Adopt-A-Beach Program, and return the cards to TGLO.
2. Participate in the Adopt-a-Highway, adopting the 2-mile portion of State Highway 4 west of its entrance to Boca Chica Beach, to keep the historic properties free from litter.

#### Section 4(f) Properties

Measures that will be implemented to reduce the impacts on Section 4(f) properties are included below under *Historical, Architectural, Archaeological, and Cultural Resources*. The FAA concluded that there is no constructive use on any Section 4(f) properties, including publicly owned parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the NRHP. The FAA is working with the consulting parties participating in the Section 106 process to develop "measures to minimize harm" to the Section 4(f) properties. The FAA considers these measures to be proposed mitigation measures. Plans being

developed as part of the BCO and Programmatic Agreement will also reduce impacts to Section 4(f) properties.

#### Noise

Measures that are being considered to reduce the impacts of construction noise on surrounding lands, including residents, park visitors, and wildlife include the following:

1. Use of baffle boxes or other functioning noise insulating enclosures for construction generators.
2. Scheduling of construction or delivery truck traffic during normal working hours between 8:00 a.m. and 5:00 p.m., Monday through Friday.
3. Use of quieter equipment or methods when possible; such as, choosing equipment with only the necessary size and power.
4. Use of quieter equipment backup alarms (manually adjustable or broadband) or no alarm, if an observer directs vehicle backup.
5. Use of quieter alternatives to pile drivers, such as screw-piles, or placing sound curtains or other temporary barriers around the pile driver.

Measures that could be implemented to reduce the impacts of operational noise on the surrounding residential areas include the following:

1. Boca Chica Village residents will be notified of each scheduled launch event and potential noise hazards well in advance of the launch day.
2. Residents will be encouraged to remain indoors during a launch event.
3. SpaceX will make hearing protection devices available to residents to reduce noise levels below 115 dBA at distances up to approximately 2.1 miles for the Falcon Heavy.

#### Light Emissions and Visual Impacts

1. Prior to construction and operational activities, a Draft Lighting Management Plan will be provided to the NPS (and USFWS, see *Biological Resources [Fish, Wildlife, and Plants]*, below). The Final Lighting Management Plan will be approved by the NPS and USFWS and implemented prior to nighttime construction activities. Potential measures from the Lighting Management Plan, which SpaceX will adhere to, include the following:
  - a. Where lighting is not essential for safety or security, timers will be installed to switch lights off in the evening. Where applicable and not a threat to security, motion-detector switches may be installed.
  - b. The size, type, and number of exterior lights will be minimized and will be restricted to low pressure sodium, to the extent practicable.
  - c. Directing, shielding, or positioning the lighting of the facilities to the extent possible (without decreasing safety and security) to minimize lateral light spread and decrease uplighting.

2. Using non-reflective material and light color, to the extent practicable, to disguise the facilities, the water tower, and the lightning protection towers, so they will blend in with the natural landscape, thus minimizing impacts within areas visible from the Palmito Ranch Battlefield NHL.

#### Historical, Architectural, Archaeological, and Cultural Resources

The fully executed Programmatic Agreement (Attachment 1) among the FAA, Texas State Historic Preservation Officer, NPS, Advisory Council on Historic Preservation, SpaceX, USFWS, and TPWD stipulates development of an MOA to resolve adverse effects per 36 CFR Part 800. The Programmatic Agreement includes stipulations on the process for minimizing and mitigating adverse effects on historic properties. The following measures to avoid, minimize, or mitigate adverse effects will be considered and may be included in the MOA:

1. Using non-reflective material and light color, to the extent practicable, to disguise the facilities, the water tower, and the lightning protection towers, so that they will blend in with the natural colors of the landscape.
2. Documenting the Cypress Pilings (41CF117.1), the Pilings Camp Site (41CF117.2), and the Palmetto Pilings (no number) through mapping, high resolution photography, and detailed description, and conducting evaluative testing of the Pilings Camp Site.
3. Adding interpretive signage about the historic sites in this area.
4. Orienting the flame duct east/southeast from the launch pad to direct the heat and combustion products and the initial sound blast away from the Cypress Pilings, the Pilings Camp Site, the Palmetto Pilings, and the Palmetto Pilings Historical Marker (no number).
5. Placing temporary construction barriers around the Palmetto Pilings Historical Marker during construction.
6. Replicating and installing the missing stars and wreaths on the Palmetto Pilings Historical Marker.
7. Conducting a vibration monitoring program to gather data on the effects of launches on the Palmetto Pilings Historical Marker and address any structural damage appropriately.
8. Creating a website on the history of the Palmito Ranch Battlefield NHL.

In addition, an Unanticipated Discoveries Plan will be prepared to outline the processes to be followed in the event previously unknown cultural resources or human remains are discovered during construction or operation of the proposed launch site.

#### Air Quality

BMPs will address potential air quality impacts during construction or operations. The emission of any air pollutants as a result of ground disturbance, use of equipment, coatings application, or other construction activities will be controlled by incorporating the following BMPs: minimal idling of engines, watering of soils to be disturbed, water and dust abatement applied to dirt roads, use of low volatility coatings, and other recognized controls.



### Water Resources (Including Surface Waters, Groundwater, Wetlands, Floodplains, and Wild and Scenic Rivers)

Measures that could be implemented to avoid and minimize impacts to water resources include the following:

1. Further modification of project design to reduce direct and indirect wetland impacts.
2. Checking construction equipment daily for leaks of petroleum products, fuels, coolants, hydraulic fluids.
3. Construction of on-site infrastructure to prevent downstream high-water velocity erosion and to retain sediment.
4. Construction of vegetated infiltration swales and bio-retention cells (rain gardens) with native plantings.

If a Department of the Army permit is authorized, it will be conditioned to require additional efforts to reduce wetland impacts and compensatory mitigation to offset the loss of function to waters of the U.S. resulting from the Preferred Alternative. SpaceX's compensatory mitigation plan proposes to preserve in-kind, high-quality wetlands at a ratio of ten times the amount of wetlands impacted by the Preferred Alternative. The mitigation site will either be conveyed to a State or Federal natural resource agency or held by a third-party in a perpetual conservation easement.

In the event of a flood or storm event, SpaceX will implement flood control measures, which could include locating water-sensitive equipment, supplies, chemicals, etc., above flood level, and moving hazardous waste outside of the floodplain when substantial storms are imminent. The implementation of these measures will reduce the likelihood that a flood or storm event might result in loss of life, injury to persons, or damage to property or otherwise be considered a "critical action" as defined in EO 11988, *Floodplain Management*.

### Biological Resources (Fish, Wildlife, and Plants)

Per the USFWS BCO, dated December 18, 2013, FAA and SpaceX have agreed to implement the following 14 voluntary Reasonable and Prudent Measures, which are necessary to minimize the impact of incidental take on ocelot, jaguarundi, aplomado falcon, piping plover, red knot, and sea turtles. In order to be exempt from prohibitions of Section 9 of the ESA, the FAA and SpaceX must comply with 15 non-discretionary Terms and Conditions stipulated in the BCO, which implement the Reasonable and Prudent Measures listed below and outline required reporting/monitoring requirements.

1. Coordinate efforts with the USFWS ocelot/jaguarundi lead biologist to protect and preserve ocelot and jaguarundi habitat.
2. Establish a protocol to notify the USFWS of direct take of an ocelot, jaguarundi, or aplomado falcon.
3. Coordinate efforts to increase northern aplomado falcon nest sites.
4. Coordinate efforts with NWR staff to reduce impacts to refuge lands.

5. Submit a detailed Security Plan.
6. Submit a detailed Sea Turtle Monitoring Plan.
7. Submit a detailed Bird Monitoring Plan.
8. Submit a detailed Vegetation Monitoring Plan.
9. Submit a detailed Stormwater Monitoring Plan.
10. Submit a detailed Light Monitoring Plan.
11. Reduce noise related to generator use during construction or operation.
12. Reduce impacts to piping plover habitat during security patrols.
13. Submit annual reports to the USFWS.
14. Coordinate decommissioning of the site with the USFWS.

SpaceX will also implement the following special conservation measures, as part of the Preferred Alternative and in accordance with SpaceX's management plans and procedures, to further avoid and minimize the impacts to biological resources.

1. In conjunction with final design, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared. The SWPPP will include BMPs for erosion and sedimentation controls, including techniques to diffuse and slow the velocity of stormwater to reduce potential impacts (e.g., soil loss and sedimentation) to water quality during construction. All construction activities with the potential of impacting water quality due to potential runoff from the site will be conducted in accordance with SWPPP requirements.
2. To the maximum extent practicable the following will be followed:
  - a. The perimeter of all areas to be disturbed during construction or maintenance activities will be clearly demarcated using flagging or temporary construction fence, and no disturbance outside that perimeter will be authorized (in particular tidal flats and dunes). All access routes into and out of the proposed disturbance area will be flagged, and no construction travel outside those boundaries will be authorized. When available, areas already disturbed by past activities or those that will be used later in the construction period shall be used for staging, parking, and equipment storage.
  - b. Roads will be designed and located where roadbed erosion into special-status species habitat is avoided or minimized and the potential for entrapment of surface flows within the roadbed due to grading will also be avoided or minimized.
  - c. The depth of any pits created will be minimized so animals do not become trapped.
  - d. Materials such as gravel or topsoil will be obtained from existing developed or previously used sources, not from undisturbed areas adjacent to the property.
  - e. Drip pans underneath equipment, containment zones used when refueling vehicles or equipment, and other measures will be implemented.

- f. Non-hazardous waste materials, litter, and other discarded materials, such as construction waste, will be contained within secured containers until removed from the construction site. All trash containers will have secured closures to prevent animal foraging.
3. Operators of vehicles within and between the vertical launch and control center areas will observe speed limits not to exceed 25 mph.
4. SpaceX employees and contractors will be educated on the potential for vehicle collisions with wildlife, particularly ocelot, jaguarundi, Texas indigo snake, and Texas tortoise. SpaceX employees will then be mandated, with strict internal repercussions, to obey speed limits on State Highway 4 and to reduce their speeds along State Highway 4 between the proposed vertical launch and control center areas to 25 mph. Vehicles will be restricted to existing paved and dirt roads, parking areas, and authorized construction sites.
5. SpaceX will coordinate with the TxDOT regarding funding the installation of “Watch Out for Ocelots/Jaguarundis” or “Watch out for Wildlife” signs along State Highway 4. The number and placement of the signs will be determined by SpaceX coordinating with TxDOT and the USFWS.
6. SpaceX will coordinate with the TxDOT to maintain clear shoulders on road edges to allow drivers to more easily see wildlife, such as ocelots and jaguarundis, along the road edge and reduce potential incidents of vehicle/wildlife collisions.
7. Prior to entry into the project area, all equipment will be cleaned to prevent importation of non-native plant species, and inspected to ensure that hydraulic fittings are tight, hydraulic hoses are in good condition and replaced if damaged, and there are no petroleum leaks.
8. No excavated or fill material will be placed in delineated CWA Section 404 waters of the U.S. except as authorized by a permit from the USACE.
9. To reduce noise impacts from generators that may be used during construction or operations, all generators are to be in baffle boxes (a sound-resistant box that is placed over or around a generator), have an attached muffler, or use other noise-abatement methods in accordance with industry standards.
10. SpaceX will designate a Field Contact Representative (FCR) that will be present during the beginning of the construction period to provide all construction personnel and SpaceX employees with an environmental worker-education briefing that will include, but not be limited to, the following:
  - a. Information regarding federally and State-listed species with the potential to occur in the area, impacts that may occur, conservation measures being implemented, their responsibilities under the ESA, and avoidance and reporting procedures.
  - b. Measures to prevent wildfires, including restricting smoking to areas clear of vegetation, ensuring no fires of any kind are ignited, and equipping vehicles with spark arrestors and fire extinguishers.

- c. Procedures to limit the spread of noxious weeds, including cleaning all equipment and vehicles at designated locations and by inspecting all vehicles to ensure absence of loose soil and plant debris before leaving the project areas.
  - d. Requirements for safe handling and disposal of hazardous wastes will be implemented.
- 11. If proposed construction activities occur during the recognized avian breeding season (February 15 through August 31), construction will occur in accordance with the MBTA to avoid impacts to nesting migratory birds within the project area. Specifically, a biologist will check the proposed areas of construction activities, including laydown areas, for nests (in shrubs and on the ground) once before the construction phase has begun. If the biologist finds an active nest, construction workers will not directly or indirectly disturb the nest or adjacent areas until the biologist determines the nest is no longer in use.
- 12. To comply with the MBTA, project design and any above-ground utility upgrades within the control center area will incorporate raptor protection measures, as appropriate and applicable. For example, structures will be equipped with devices to discourage nest building and perching (e.g., monopole technology and visual fright devices).
- 13. To avoid and minimize impacts to birds from the proposed four lightning protection towers, the towers will be constructed to comply, as practicable and applicable, with voluntary USFWS guidelines for communication tower siting, construction, operation, and decommission.
- 14. In coordination with NWR staff, FAA/SpaceX will identify further options that will assist in protecting refuge lands and species habitats from impacts that may occur from the public intrusions prior to closures. For example, vehicle barriers, in the form of short, spaced posts, sufficiently close together to prevent a truck or ATV from entering, but wide enough apart to allow for terrestrial animals to pass. This could be done alongside State Highway 4 or other identified roads where the footprint is already disturbed.
- 15. A detailed Security Plan will be developed to fully describe agreements and plans with local authorities whose support is needed to ensure public safety during launch procedures, locations of checkpoints and roadblocks, who will secure those areas, exact type of unmanned and manned aerial and ground vehicles to be used to perform pre-launch security sweeps, and if necessary in the future, a location on private land for public viewing.
- 16. Educate the public on safe and lawful areas where they may watch launches.
- 17. SpaceX will provide the USFWS with a Vegetation Monitoring Plan tracking potential induced vegetative changes in piping plover critical habitat as a result of proposed construction activities, stormwater discharge, and launch activities. Vegetation monitoring will be conducted within the area within 1,000 ft of the proposed SpaceX facilities. The Vegetation Monitoring Plan will be submitted in accordance with the BCO and will detail monitoring methods, reporting requirements, and actions to be taken if changes in

vegetation are observed and they are found to be directly related to SpaceX activities and operations.

18. A qualified biologist will conduct pre-, during, and post-construction surveys for piping plovers, red knots, and aplomado falcons. The monitoring will include presence/absence surveys and will record the number and location of all candidate and federally listed species observed, including the piping plover, red knot, and aplomado falcon, as well as all migratory birds.
19. A qualified biologist will conduct pre- and post-launch surveys for piping plovers, red knots, and aplomado falcons. Monitoring will be conducted the day before the launch and the day after the launch. The monitoring will include presence/absence surveys and will record the number and location of all candidate and federally listed species observed, including the piping plover, red knot, and aplomado falcon, as well as all migratory birds. An Avian Monitoring Plan will be prepared detailing survey methods, survey routes, and monitoring and reporting requirements for construction- and operational-related surveys.
20. To avoid and minimize potential impacts to piping plovers and red knots during pre-launch security patrols, security vehicles or other necessary equipment on the beach will be driven above the "wet line" to minimize disturbance of birds and protect feeding and roosting areas.
21. As SpaceX will conduct pre-launch security patrols of Boca Chica Beach during sea turtle nesting season (March 15 to October 1), SpaceX will prepare a Sea Turtle Monitoring Plan. The plan will describe how sea turtle surveys will be conducted, when they will be conducted (i.e., pre- and post-launch), and by whom.
22. Prior to construction and operational activities, a Draft Lighting Management Plan will be prepared. The Final Lighting Management Plan will be approved by the USFWS (and NPS; see Section 6.4, *Light Emissions and Visual Impacts*, above) and implemented prior to nighttime construction activities to minimize overall lighting impact, including potential direct impacts and cumulative glow, on wildlife and adjacent sea turtle nesting beaches. Examples of lighting requirements that will be incorporated into the plan include:
  - a. SpaceX will issue annual notices to all complex personnel prior to sea turtle nesting season reminding personnel of light use requirements and responsibilities.
  - b. The USFWS may conduct on-site inspections coordinated with SpaceX to verify compliance and make recommendations for changes and revisions to the plan, limited to once per year.
  - c. SpaceX will direct, shield, or position the lighting of facilities to the extent possible (without decreasing safety and security) to avoid visibility from the beach, minimizes lateral light spread, and decrease uplighting. Low-pressure sodium lighting will be used where possible.
  - d. Where applicable, new lighting will be installed with multiple levels of control so that lighting levels can be matched with specific activities.

- e. Where lighting is not essential to safety or security, timers will be installed to switch lights off in the evening. Where applicable and not a threat to security, motion-detector switches may be installed.
  - f. Should there be the need for additional local temporary lighting to support construction activities, the following requirements will be adhered to:
    - i. Whenever possible, lights shall be placed in such a way that they do not shine directly towards the beach. Additionally, to the maximum extent possible, no uplighting will be used.
    - ii. Lighting will be extinguished upon completion of work in that area.
    - iii. The size, type and number of exterior lights will be minimized and will be restricted to low pressure sodium, to the extent practicable, during sea turtle nesting season.
    - iv. Fixtures will be shielded or screened whenever practical.
    - v. Lighting will be monitored on a routine basis by anyone utilizing the lights.
23. In coordination with private organizations (e.g., The Peregrine Fund) or state and federal agencies, FAA/SpaceX will assist efforts to increase releases (i.e., hack sites) or nest boxes in suitable northern aplomado falcon habitat.
24. To the maximum extent possible, SpaceX will avoid launches at dusk and dawn during the most active time for jaguarundis and ocelots.
25. In coordination with the ocelot/jaguarundi biologist, FAA/SpaceX will identify reasonable measures to protect and/or preserve suitable habitat within the Rio Grande Wildlife Corridor.
26. In the event that proposed construction or operational activities result in the direct take (killing, harming, or maiming) of an ocelot, jaguarundi, aplomado falcon, piping plover, red knot, and/or nesting sea turtle, the FCR shall notify the USFWS immediately.
27. The Draft Security Plan and all monitoring plans will be provided for review and comment by the USFWS within 60 days after issuance of the Final BCO. The final plans will be submitted to the USFWS within 30 days after receipt of USFWS comments on the draft plans, and any further coordination between the USFWS and FAA/SpaceX regarding the plans and their implementation. If additional time is needed FAA/SpaceX will coordinate with USFWS.
28. FAA/SpaceX will submit an annual summary report to the USFWS Coastal Ecological Services Field Office by December 31 of each year. The FAA/SpaceX summary report will include monitoring reports, measures implemented during project activities, success of such measures, incidences, and any recommendations on improvements to those measures. Reports will be sent to: USFWS, Coastal Ecological Services Field Office, ATTN: Field Supervisor, Corpus Christi, Texas.
29. SpaceX will designate an FCR who will be responsible for overseeing compliance with these SCMs and any other required terms and conditions resulting from consultation between

the FAA/SpaceX and USFWS. The FCR will have the authority to halt construction, operation, or maintenance activities that are in violation of these requirements.

#### Hazardous Materials, Pollution Prevention, and Solid Waste

Measures that will be implemented to reduce impacts of hazardous materials and solid waste include the following:

1. SpaceX will have spill response materials (e.g., sorbents, drain covers, mops, brooms, shovels, drum repair materials and tools, warning signs and tapes, and personal protective equipment) readily available for use in storage areas, during fueling, and during transport in the event of an unplanned release.
2. SpaceX will implement a Hurricane Plan and SPCCP to prevent the accidental release of fuels. Measures could include:
  - a. Design of elevated and reinforced facilities to withstand wind and waves to mitigate damage and release of fuels.
  - b. Containment areas around fuel tanks will be sized to contain the volume of the largest tank plus sufficient freeboard for a 25-year, 24-hour storm event (7.6 inches).
  - c. In advance of a storm alert, hazardous materials will be removed from the site or to high ground.
  - d. All equipment and loose objects will be secured to the ground or removed.
  - e. Propellant deliveries will be canceled
  - f. Vehicles will be removed or stored in the hangar
  - g. Storm preparations also include communication with local emergency management agencies, USFWS, and TPWD
3. If the site were to be permanently closed in the future, SpaceX will remove all hazards after the site is no longer in use and will coordinate with USFWS and other relevant parties regarding the future of the site.
4. If a launch failure occurred, SpaceX and the FAA will contact USFWS to reinstate ESA Section 7 consultation for emergency purposes to assess the impacts of the incident as well as the impacts from cleanup and restoration. In accordance with the BCO (Appendix G), FAA/SpaceX will develop a Hazardous Materials Emergency Response Plan for the launch facility and the control site. The plan will include the policies, process, and procedures used in handling hazardous materials during operations and in the event of an unplanned or uncontrolled release, a list of hazardous materials stored on site, and a launch vehicle failure response plan in the event of a mishap. USFWS and TCEQ will be contacted if impacts extend beyond the fence line and will be participants in developing the cleanup and mitigation plans.



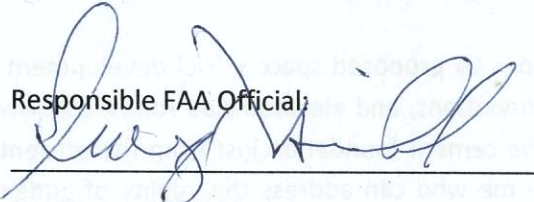
## Decision and Order

I have considered potential environmental impacts as analyzed in the Final EIS, applicable regulatory requirements, public comments, and FAA's responsibilities to encourage, facilitate, and promote commercial space launches and reentries by the private sector; and to facilitate the strengthening and expansion of the U.S. space transportation infrastructure in my decision.

The No Action Alternative would result in restrictive licensing that would impede the FAA's ability to assist the commercial space transportation industry in meeting projected demand for services and expansion in new markets. The Preferred Alternative would allow the greatest development and growth of the U.S. commercial space launch industry.

I have carefully considered the FAA's goals and objectives in relation to issuing launch licenses and/or experimental permits that would allow SpaceX to launch the Falcon 9 and Falcon Heavy orbital vertical launch vehicles, and a variety of reusable suborbital launch vehicles, from a launch site on privately owned property in Cameron County, Texas. I have considered the purpose and need to be served, the alternative means of achieving them, the environmental impacts of these alternatives, and the mitigation measures available to preserve and enhance the environment. I have determined that all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted. Based upon the record of this proposed Federal action, and under the authority delegated to me by the Administrator of the FAA, I find that the Selected Action described in this Record of Decision is reasonably supported.

Responsible FAA Official:



Dr. George C. Nield  
Associated Administrator for  
Commercial Space Transportation

7/9/2014

Date

## RIGHT OF APPEAL

This decision is taken pursuant to 49 U.S.C. Subtitle VII, Parts A and B, and constitutes a Final Order of the Administrator, subject to review by the courts of appeals of the United States in accordance with the provisions of 49 U.S.C. § 46110.



## **Appendix A – Comment Addendum**

Three substantive comments were received on the Final EIS. They are included below.

### **1. USACE.**

USACE noted that the description of the Rivers and Harbors Act on page 3-46 of the Final EIS is inaccurate. USACE provided a more accurate description as follows:

That the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is hereby prohibited; and it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of War; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same.

FAA Response: Correction Noted.

### **2. Maria Crowl-Pointer.**

“Our property on the highway is bordered on three sides by proposed space x [sic] development. With the road widening / elevation, cement pads / foundations, and elevated side roads, our low land will be flooded out. We watch the rains run by the cement foundation just from the present road. Is there any point of contact that you can give me who can address this reality of added drainage into our low land? Sumpage will also add to shifting of foundation, and a handful of other uninvited infestations.

Please let us know of a P.O.C. and / or time frame to voice our concerns which are many.”

FAA Response: Thank you for your comment. The comment period on the Draft EIS closed on June 24, 2013.

### **3. USFWS.**

USFWS reaffirmed the language in the FEIS in Section 4.2 “Section 4(f) Properties”, on page 4-13, which states that the NPS does not concur with the FAA’s determination that the project will not constitute a constructive use of the Palmito Ranch Battlefield NHL.

FAA Response: Thank you for your comment. The FAA’s consultation process is outlined in the Findings Section of the ROD.

**Attachment 1. Programmatic Agreement Among the Federal Aviation Administration, the Texas State Historic Preservation Officer, National Park Service, the Advisory Council on Historic Preservation, Space Exploration Technologies Corp., United States Fish and Wildlife Service, and Texas Parks and Wildlife Department, Regarding the Construction and Operation of a SpaceX Texas Launch Site, Cameron County, Texas**

**PROGRAMMATIC AGREEMENT  
AMONG  
THE FEDERAL AVIATION ADMINISTRATION,  
THE TEXAS STATE HISTORIC PRESERVATION OFFICER,  
NATIONAL PARK SERVICE,  
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,  
SPACE EXPLORATION TECHNOLOGIES CORP.,  
UNITED STATES FISH AND WILDLIFE SERVICE, AND  
TEXAS PARKS AND WILDLIFE DEPARTMENT,  
REGARDING THE  
CONSTRUCTION AND OPERATION OF A SPACEX TEXAS LAUNCH SITE,  
CAMERON COUNTY, TEXAS**

**WHEREAS**, the Federal Aviation Administration (FAA) Office of Commercial Space Transportation plans to evaluate applications from Space Exploration Technologies Corp. (SpaceX) for launch licenses and/or experimental permits (as described in Attachment A) to conduct launches of the Falcon Program launch vehicles (Falcon 9 and Falcon Heavy) and a variety of reusable suborbital launch vehicles from a private launch site on privately owned property in Cameron County, Texas (the Project); and

**WHEREAS**, the Project would involve SpaceX constructing a vertical launch area and a launch control center on private property to launch vehicles from their private, exclusive space launch site in Cameron County, Texas, as described in Attachment A; and

**WHEREAS**, Project launch operations would involve the closure of the area approximately fourteen (14) to sixteen (16) miles west of the State Highway (SH) 4 terminus at Boca Chica Beach and Boca Chica State Park, as described in Attachment A and shown in Attachment A, Exhibit A-1, up to twelve (12) times a year for a period of up to fifteen (15) hours each time for the safety and security of the general public; and

**WHEREAS**, the FAA has determined the Project is a federal undertaking (Undertaking) subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, and its implementing regulations, 36 Code of Federal Regulations (CFR) § 800; and

**WHEREAS**, this Programmatic Agreement (PA or Agreement) has been developed, pursuant to 36 CFR § 800.14(b), to govern the implementation of a program for the continued assessment of effects on historic properties and the resolution of adverse effects on historic properties, and this PA will govern completion of FAA's Section 106 compliance responsibilities; and

**WHEREAS**, the FAA, in consultation with the Texas State Historic Preservation Officer (SHPO) considered the potential direct, indirect, and cumulative effects of the Undertaking as provided in 36 CFR §§ 800.4(a) and 800.16(d) and established and inventoried an Area of Potential Effects (APE) for archaeological resources that encompasses the entire 50-acre vertical launch area as well as the three parcels (approximately 21 acres) that comprise the control center, and an APE for architectural resources, cultural landscapes, and viewsheds that encompasses a 5-mile radius centered on the vertical launch area (see Attachment B); and

**WHEREAS**, the FAA conducted archaeological and architectural investigations within the APEs to identify properties that are listed in or eligible for listing in the National Register of Historic Places (National Register) in consultation with the Texas SHPO and identified eleven (11) historic properties within the APEs; a complete listing of these historic properties is included as Attachment C in this Agreement; and

**WHEREAS**, the FAA has prepared the following reports in its evaluation of the effects of the proposed Project on historic properties: (1) *Environmental Impact Statement, SpaceX Texas Launch Site*; (2) *Final Archaeological Resources Investigation for the Proposed SpaceX Texas Launch Site, Cameron County, Texas*; and (3) *Final Architectural Survey for the Proposed SpaceX Texas Launch Site, Cameron County, Texas*, and these reports provide supporting information to this PA; and

**WHEREAS**, the FAA has determined that the Undertaking will have an adverse effect on properties listed in or eligible for listing in the National Register as discussed below, and has consulted with the Texas SHPO pursuant to 36 CFR § 800; and

**WHEREAS**, the FAA, in consultation with the Texas SHPO, determined the Undertaking will cause adverse effects to the Palmito Ranch Battlefield, a National Historic Landmark (NHL), due to the construction of the vertical launch and control center facilities and secondary (induced) impacts (described below) that could diminish the NHL's integrity of setting and feeling; and

**WHEREAS**, Section 110(f) of the NHPA specifies that for a Federal undertaking affecting an NHL, the Federal agency will "to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm" to the NHL; and

**WHEREAS**, one of the affected properties is the 1936 Centennial Marker for the Palmetto Pilings, which the FAA, in consultation with the Texas SHPO, determined is eligible for listing on the National Register and may be adversely affected by the Undertaking due to vibration from launch events and secondary (induced) impacts (described below); and

**WHEREAS**, two of the affected properties are the 1846 Cypress Pilings (41CF117.1) and the 1865 Palmetto Pilings (no number), which the FAA, in consultation with the Texas SHPO, determined are eligible for listing in the National Register; and

**WHEREAS**, one of the affected properties is the Pilings Camp Site (41CF117.2), which the FAA, in consultation with the Texas SHPO, determined would be treated as a National Register-eligible property; and

**WHEREAS**, the FAA, in consultation with the Texas SHPO, determined the Undertaking will cause adverse effects to the Palmito Ranch Battlefield, the 1936 Centennial Marker for the Palmetto Pilings, the 1846 Cypress Pilings (41CF117.1), the 1865 Palmetto Pilings (no number), and the Pilings Camp Site (41CF117.2) from secondary (induced) impacts as a result of increased vehicular traffic (i.e., fuel and water trucks) associated with the construction and

operation of the facility, as well as increased foot traffic and vehicular traffic from an anticipated influx in visitors to the area; and

**WHEREAS**, pursuant to this PA, SpaceX will prepare additional plans as outlined in Attachment D, in order to provide information for FAA to further assess effects and resolve adverse effects; and

**WHEREAS**, the FAA identified the Apache Tribe of Oklahoma, the Comanche Nation of Oklahoma, the Kiowa Tribe of Oklahoma, the Mescalero Apache Tribe of New Mexico, and the Tonkawa Tribe of Oklahoma as having religious or cultural affiliation with the Project area, and invited the tribes to participate in the Section 106 process and will continue to be consulted regarding assessments of effects and resolution of adverse effects resulting from actions taken as part of this Undertaking (see Attachment E for a summary of Tribal consultation); and

**WHEREAS**, the public has been provided opportunities to comment on the Project and participate in the Section 106 process, first in FAA's publication of the Notice of Intent in the *Federal Register* on 10 April 2012 (77 FR 21619), through a public scoping meeting on 15 May 2012 and a public hearing on 7 May 2013 as part of the National Environmental Policy Act process, and through a sixty (60) day review and comment period for the *Draft Environmental Impact Statement, SpaceX Texas Launch Site*, and the FAA has considered the public's comments in development of this Agreement; and

**WHEREAS**, the FAA received a number of comments from the public regarding cultural resources, and the public comments identified cultural and historic sites in the area and expressed concern for minimizing impacts to these sites; and

**WHEREAS**, the FAA invited the National Park Service (NPS), which administers the NHL Program, to participate in the consultation process as a consulting party pursuant to 36 CFR § 800.2(c)(5) by letter dated 18 June 2012, and has invited them as a Signatory to this Agreement; and

**WHEREAS**, the FAA did not identify other consulting parties pursuant to 36 CFR § 800.2(c)(5), and no individuals or organizations requested to the FAA to be a consulting party; and

**WHEREAS**, on 8 April 2014, the NPS transmitted a written request to the FAA for a written justification of the Section 106 Undertaking and APE for the Project, and the FAA provided a written response to the NPS on 21 April 2014; and

**WHEREAS**, the Palmito Ranch Battlefield NHL is located within land owned by the U.S. Fish and Wildlife Service (USFWS); therefore, the agency may need to grant access, permissions, or issue permits for measures outlined in this Agreement; and

**WHEREAS**, the FAA invited the USFWS to participate in consultation for this Undertaking by letter dated 10 May 2013, and USFWS is an Invited Signatory to this Agreement; and

**WHEREAS**, the 1936 Centennial Marker for the Palmetto Pilings, the 1846 Cypress Pilings (41CF117.1), the Pilings Camp Site (41CF117.2), and the 1865 Palmetto Pilings (no number), are located within Boca Chica State Park on land owned by the Texas Parks and Wildlife Department (TPWD) and leased to the USFWS; therefore, the TPWD may need to grant access, permissions, or issue permits to implement the procedures set forth in this Agreement; and

**WHEREAS**, the FAA invited the TPWD to participate in consultation for this Undertaking by letter dated 10 May 2013, and TPWD is an Invited Signatory to this Agreement; and

**WHEREAS**, in accordance with 36 CFR § 800.6(a)(1), the FAA has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation on 14 June 2012; and

**WHEREAS**, the FAA invited the ACHP to participate in consultation for this Undertaking pursuant to 36 CFR § 800.6(a)(1)(iii) by letter dated 28 June 2012, and ACHP decided to participate in consultation by letter dated 23 July 2012, and is a Signatory to this Agreement; and

**NOW, THEREFORE**, the FAA, Texas SHPO, NPS, ACHP, SpaceX, USFWS, and TPWD agree that the Undertaking will be implemented in accordance with the following Stipulations in order to take into account the effects of the Undertaking on historic properties:

## **STIPULATIONS**

The FAA will ensure the following measures are carried out:

### **I. PROFESSIONAL QUALIFICATIONS**

- a. All work conducted under this Agreement will be conducted by or under the direct supervision of professionals meeting the federal qualification standards in the discipline appropriate to the properties being treated (Archaeology for treatments of archaeological sites; History, Architectural History, and/or Historic Architecture for aboveground resources), as established by the Secretary of the Interior and published in 36 CFR Part 61, Appendix A.
- b. All engineering related work conducted under this Agreement will be conducted by a qualified professional engineer appropriate to the type of work specified.
- c. Standards, guidelines, and statutes. All cultural resource work conducted under this Agreement will be consistent with NHPA (16 U.S.C. § 470) and Texas Administrative Code Title 13, Part 2, Chapter 26 and conducted in accordance with the following standards, guidelines, and statutes as applicable:
  - i. The Secretary of the Interior: *Standards and Guidelines for Archeology and Historic Preservation* (1983) (48 FR 44716-44742), including the Standards for the Treatment of Historic Properties (1995);

- ii. Advisory Council on Historic Preservation: *Treatment of Archeological Properties: A Handbook* (1980), and the *ACHP Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects*, dated 23 February 2007; and
- iii. Texas Historical Commission: *Archeological Survey Standards for Texas* and Council of Texas Archeologists: *Guidelines for Cultural Resource Management Reports*.

## **II. TRIBAL CONSULTATION PROTOCOLS**

- a. The FAA will afford the Apache Tribe of Oklahoma, the Comanche Nation of Oklahoma, the Kiowa Tribe of Oklahoma, the Mescalero Apache Tribe of New Mexico, and the Tonkawa Tribe of Oklahoma the opportunity to review and comment on any draft plan or report associated with this Undertaking, including determinations of effects and the development of Memoranda of Agreement (MOAs) consistent with Stipulation V.
- b. The FAA will include in the Unanticipated Discoveries Plan described in Stipulation VI the protocols for notifying and consulting with tribes in the event of a discovery of human remains and/or funerary objects.

## **III. DEVELOPMENT, REVIEW, AND APPROVAL OF DOCUMENTS**

- a. Development, review, and approval of any draft plan or report associated with this Undertaking, including Launch Site Plans (listed in Attachment D) and the Unanticipated Discoveries Plan (described in Stipulation VI) will follow these procedures:
  - i. SpaceX has primary responsibility for developing and revising all plans identified in the Stipulations of this PA.
  - ii. The FAA will review all plans developed by SpaceX, and upon approval, the FAA will distribute drafts of all plans to the Signatories and Invited Signatories to this Agreement for review and comment. Signatories and Invited Signatories will have thirty (30) calendar days from the date of receipt to review and comment.
  - iii. Within the 30-day review period, the FAA will coordinate a meeting with the Signatories and Invited Signatories to this Agreement to facilitate comments on the plans. The FAA and SpaceX will take all comments into consideration when updating the plans. The FAA will share with all Signatories and Invited Signatories the comments of the others. Signatories and Invited Signatories may request the preparation of additional plans if the plans submitted fail to address specific potential effects to the identified historic properties.

- iv. The FAA will distribute the revised plans to the Signatories and Invited Signatories to this Agreement for review and comment. Signatories and Invited Signatories will have fifteen (15) calendar days from the date of receipt to review and comment.
- v. The FAA and SpaceX will take all comments into consideration when updating the revised plans. The FAA will coordinate a meeting with the Signatories and the Invited Signatories to resolve comments and review the updated plans. The FAA will share with all Signatories and Invited Signatories the comments of the others. If the FAA cannot resolve the comments, the FAA will follow the procedures under Stipulation X.b-d.
- vi. The FAA will submit a final draft version of each plan to the Signatories and Invited Signatories to this Agreement for a five (5) business day review and written concurrence. If no written concurrence is received from the Signatories or Invited Signatories by the end of the 5-day review period, the FAA will proceed on the final draft version.
- vii. The FAA will notify the Signatories and Invited Signatories of approval of any plans, and will provide copies of the final versions to Signatories and Invited Signatories.
- viii. SpaceX has primary responsibility for implementation of approved plans, and the FAA has responsibility for the oversight of these actions.
- ix. SpaceX is responsible for any additional permits and compliance (Federal, State, and local) beyond the authority of the PA.

#### **IV. ASSESSMENT OF EFFECTS**

- a. The FAA will assess the effects on historic properties in the APE from implementing the actions specified in any plan associated with this Undertaking. The effects assessment will apply the Criteria of Adverse Effect, as described at 36 CFR § 800.5(a)(1).

Review process:

- i. The FAA will present the determination of effects for each plan in a cover letter and distribute it with the associated plan to all Signatories and Invited Signatories to this Agreement for review and comment. The cover letter will include documentation that evidences how the FAA considered avoidance and minimization alternatives prior to making a final effect determination. Signatories and Invited Signatories will have thirty (30) calendar days from the date of receipt to review and comment.



- ii. Within the 30-day review period, the FAA will coordinate a meeting with the Signatories and Invited Signatories to this Agreement to facilitate comments on the determinations of effects. The FAA will share with all Signatories and Invited Signatories the comments of the others.
  - iii. The FAA and SpaceX will take all comments into consideration. The FAA will coordinate a meeting with the Signatories and the Invited Signatories to resolve an objection to an effects determination. If the FAA cannot resolve the objection, the FAA will follow the procedures under Stipulation X.b–d.
  - iv. For each plan, the FAA will submit a final determination of effects in a cover letter with the final draft version of the associated plan to the Signatories and Invited Signatories to this Agreement for a five (5) business day review and written concurrence. If no written concurrence is received from the Signatories or Invited Signatories by the end of the 5-day review period, the FAA will proceed on the determination of effects.
  - v. If any Signatories and Invited Signatories provide the FAA with a written objection regarding a No Adverse Effect determination within the 5-day review period, the FAA will consult with the Signatories to resolve the objection. If the FAA cannot resolve the objection, the FAA will follow the procedures under Stipulation X.b–d.
- b. If the FAA determines, through consultation, that an effect will be adverse, the FAA will resolve adverse effects to historic properties in accordance with the procedures under Stipulation V.

## **V. RESOLUTION OF ADVERSE EFFECTS**

- a. Adverse effects would be resolved through the consultation process outlined in 36 CFR § 800.6.
  - i. The FAA will consult with the Signatories, Invited Signatories and other consulting parties recognized by the FAA to seek ways to avoid or minimize adverse effects.
  - ii. After avoidance and minimization measures are agreed to by the Signatories and Invited Signatories, if an adverse effect remains, the FAA will execute an MOA(s) with the Signatories and Invited Signatories to document mitigation measures.
  - iii. The FAA will submit a copy of any executed MOA to the ACHP.
  - iv. The FAA will ensure that the Undertaking is carried out in accordance with the MOA(s).

## **VI. POST-REVIEW DISCOVERIES**

- a. Prior to the start of construction activities, SpaceX will develop an Unanticipated Discoveries Plan that will specify the exact procedures to be followed in the event that previously unidentified properties are discovered or unanticipated effects on historic properties are identified during implementation of the Project. The Unanticipated Discoveries Plan will be developed in consultation as described under Stipulation III.

## **VII. COORDINATION WITH OTHER FEDERAL REVIEWS**

- a. In the event that SpaceX applies for federal funding or approvals for the Undertaking from another agency and the Undertaking remains unchanged, such funding or approving agency may comply with Section 106 by agreeing in writing to the terms of this Agreement and notifying and consulting with Texas SHPO and ACHP. Any necessary modifications will be considered in accordance with Stipulation XI.

## **VIII. PROJECT CHANGES**

- a. The FAA will not change the Undertaking without first affording the parties (refer to Attachment F) to this Agreement the opportunity to review the proposed change and determine whether it will require revisions be made to this Agreement. If revisions are needed, the FAA will consult in accordance with Stipulation XI to make such revisions.

## **IX. MONITORING AND REPORTING**

- a. Each year following the execution of this Agreement, the FAA will provide the Signatories and Invited Signatories an annual report detailing work undertaken pursuant to its terms. The FAA will distribute the report to all parties (refer to Attachment F) to this Agreement at least fifteen (15) calendar days prior to the Annual Meeting (described below).
  - i. The annual report will include scheduling changes proposed, any problems encountered, and any disputes and objections received in FAA's efforts to carry out the terms of this Agreement.
  - ii. The annual report will include a section to be prepared by SpaceX of activities as they relate to compliance with the stipulations of this Agreement. The annual report will include the following:
    - 1) A description of the past year's efforts and anticipated upcoming efforts for identification, evaluation, mitigation, and protection of historic properties.
    - 2) An evaluation of the progress of mitigation activities.
    - 3) A description of any known or expected changes to the Undertaking.

- b. Annual Meeting: For the life of this Agreement, the FAA will coordinate a meeting of the Signatories and Invited Signatories to be held each year in February or March, or another mutually agreed upon date, to discuss activities carried out pursuant to this Agreement during the preceding year and activities scheduled for the upcoming year.
  - i. The FAA will evaluate the effectiveness of this Agreement and whether any amendments or changes are needed based on SpaceX's progress reports or project modifications and provide its evaluation to Signatories and Invited Signatories prior to the Annual Meeting.
  - ii. The meeting will be held in a location agreed upon by consensus of the Signatories and Invited Signatories, and parties may participate by telephone if they so desire. The FAA will distribute minutes of the meeting to all Signatories and Invited Signatories within two weeks of the meeting.

## **X. DISPUTE RESOLUTION**

- a. Should any Signatory or Invited Signatory object to any plans or actions pursuant to this Agreement or the manner in which the terms of this Agreement are implemented, the objecting party will provide written notice to the FAA. The FAA will take the objection into account and consult, as needed, within ten (10) business days with the Signatories and Invited Signatories to resolve the objection. Copies of written objections will be submitted simultaneously to all Signatories.
- b. If the FAA determines that the objection cannot be resolved, the FAA will forward all documentation relevant to the dispute to the ACHP and request that the ACHP provide its advice on the resolution of the objection. The ACHP will provide the FAA with its advice on the resolution of the objection within thirty (30) calendar days of receiving adequate documentation.
- c. The FAA will prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, Signatories, and Invited Signatories and provide them with a copy of this written response. The FAA will then proceed according to its final decision.
- d. Any ACHP comment provided in response to such a request will be taken into account by the FAA, in accordance with 36 CFR § 800.6(c)(2), with reference only to the subject of the dispute. All responsibilities to carry out actions under this Agreement that are not subject to the dispute will remain unchanged.

## **XI. DURATION, AMENDMENT, AND TERMINATION**

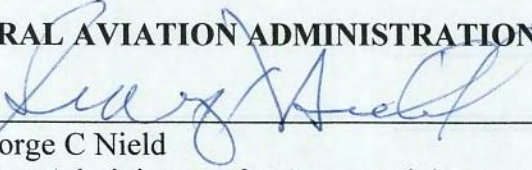
- a. This Agreement will become effective upon execution by the FAA, Texas SHPO, NPS, ACHP, SpaceX, USFWS, and TPWD, and will remain in effect for a term of

- ten (10) years from its date of execution, at which time the FAA or SpaceX may seek to extend this Agreement for an additional period of time.
- b. Any Signatory or Invited Signatory to this Agreement may request the other Signatories and Invited Signatories consider amending it, in which case the parties will consult to consider the proposed amendment(s). The amendment will be effective on the date a copy is signed by all of the Signatories and Invited Signatories.
  - c. If any Signatory or Invited Signatory to this Agreement determines that its terms will not or cannot be carried out, that party will immediately consult with the other parties to attempt to develop an amendment per Stipulation XI.b. If within thirty (30) calendar days (or another time period agreed to by all Signatories) an amendment cannot be reached, any Signatory or Invited Signatory may terminate the Agreement upon written notification to the other Signatories and Invited Signatories.
  - d. A year prior to the expiration of the Agreement, the Signatories and Invited Signatories will consult to determine whether the Agreement should be extended for a period to be determined. If the term of the Agreement is not extended through an amendment, then the Agreement will expire at the end of the duration period set forth in Stipulation XI.a.
  - e. Once the Agreement is terminated, and prior to work continuing on the Undertaking, the FAA must either execute a new Agreement pursuant to 36 CFR § 800.6, or request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. The FAA will notify the Signatories and Invited Signatories as to the course of action it will pursue.

Execution of this Agreement by the FAA, Texas SHPO, NPS, ACHP, SpaceX, USFWS, and TPWD, and implementation of its terms by the Signatories and Invited Signatories, is evidence the FAA has taken into account the effects of the Undertaking on historic properties.

**SIGNATORIES**

**FEDERAL AVIATION ADMINISTRATION**

By:   
Dr. George C Nield  
Associate Administrator for Commercial Space Transportation

Date: 5/13/2014

**TEXAS STATE HISTORIC PRESERVATION OFFICER**

By: Mark Wolfe  
Mark Wolfe

Date: 5/12/14

NATIONAL PARK SERVICE

By: Jana C. Joss  
Acting for Sue E. Masica, Director, Intermountain Region

Date: May 22, 2014

**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

By: John M. Fowler

John M. Fowler  
Executive Director

Date: 5/16/14



**INVITED SIGNATORIES**

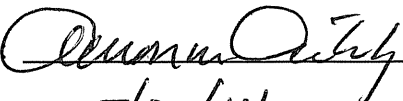
**SPACE EXPLORATION TECHNOLOGIES CORP.**



By: \_\_\_\_\_  
Steven Davis  
Director of Advanced Projects, Space Exploration Technologies

Date: May 15, 2014\_\_\_\_\_

**UNITED STATES FISH AND WILDLIFE SERVICE**

By  **Aaron M. Archibeque**  
**Regional Chief, NWRS**

Date: 5/30/14

**TEXAS PARKS AND WILDLIFE DEPARTMENT**

By: \_\_\_\_\_

Ross Melinchuk, Deputy Executive Director- Natural Resources

Date: May 20, 2014

## **ATTACHMENT A. PROJECT DESCRIPTION**

As part of FAA's Proposed Action of issuing launch licenses and/or experimental permits to SpaceX, SpaceX would construct a vertical launch area and a control center area to support up to 12 commercial launch operations per year. The vehicles that would be launched include the Falcon 9, Falcon Heavy (up to two launches per year), and a variety of smaller reusable suborbital launch vehicles. Launch operations include not only launches, but also pre-flight activities such as mission rehearsals and static fire engine tests. SpaceX would be required to apply for the appropriate launch licenses and/or experimental permits to be issued by the FAA. SpaceX would be the exclusive user of the site.

The proposed vertical launch area is currently undeveloped and is located directly adjacent to the eastern terminus of SH 4 (Boca Chica Boulevard) and to Boca Chica State Park and Lower Rio Grande Valley National Wildlife Refuge lands. It is located approximately 3 miles north of the U.S/Mexico border on the Gulf Coast and approximately 5 miles south of Port Isabel and South Padre Island. Access to the area is from SH 4. Proposed facility and infrastructure construction at the vertical launch area would include an integration and processing hangar; a launch pad and stand with its associated flame duct; a water tower; lightning protection towers (four total); a retention basin for deluge water; propellant storage and handling areas; a workshop and office area; a warehouse for parts storage; and roads, parking areas, fencing, security, lighting, and utilities. The parcel where the vertical launch area would be located is 56.5 acres; however, development of the vertical launch area would only comprise approximately 20 acres.

The proposed control center would be located immediately adjacent to Boca Chica State Park and Boca Chica Village, approximately 2 miles west of the proposed vertical launch area and north of SH 4. Proposed facility and infrastructure construction at the control center area would include two launch control center buildings; two payload processing facilities; a launch vehicle processing hangar; two radio frequency transmitter/receivers; generators and diesel storage facilities; roads, parking areas, fencing, security, lighting, utilities; and a satellite fuels storage facility. In addition, new power lines would be installed underground in the SH 4 road right-of-way from the control center area to the vertical launch area.

The Falcon 9 is a medium-lift class launch vehicle with a gross lift-off weight of approximately 1,100,000 pounds (lbs) with an approximate length of 224 feet (ft). The Falcon 9 uses liquid oxygen (LOX) and highly refined kerosene, also known as rocket propellant-1 or refined petroleum-1 (RP-1), as propellants to carry payloads into orbit. The Falcon Heavy is a heavy-lift class launch vehicle with a gross lift-off weight of approximately 3,400,000 lbs. It has a width of 36 ft and an overall length of approximately 224 ft.

All Falcon 9 and Falcon Heavy launches would be expected to have payloads, including satellites or experimental payloads. In addition to standard payloads, the Falcon 9 and Falcon Heavy may also carry a capsule, such as the SpaceX Dragon capsule. Most payloads would be commercial; however, some could be Department of Defense payloads, National Aeronautics and Space Administration (or NASA) payloads, or a Federal contribution to a commercial payload. All launch trajectories would be to the east over the Gulf of Mexico.

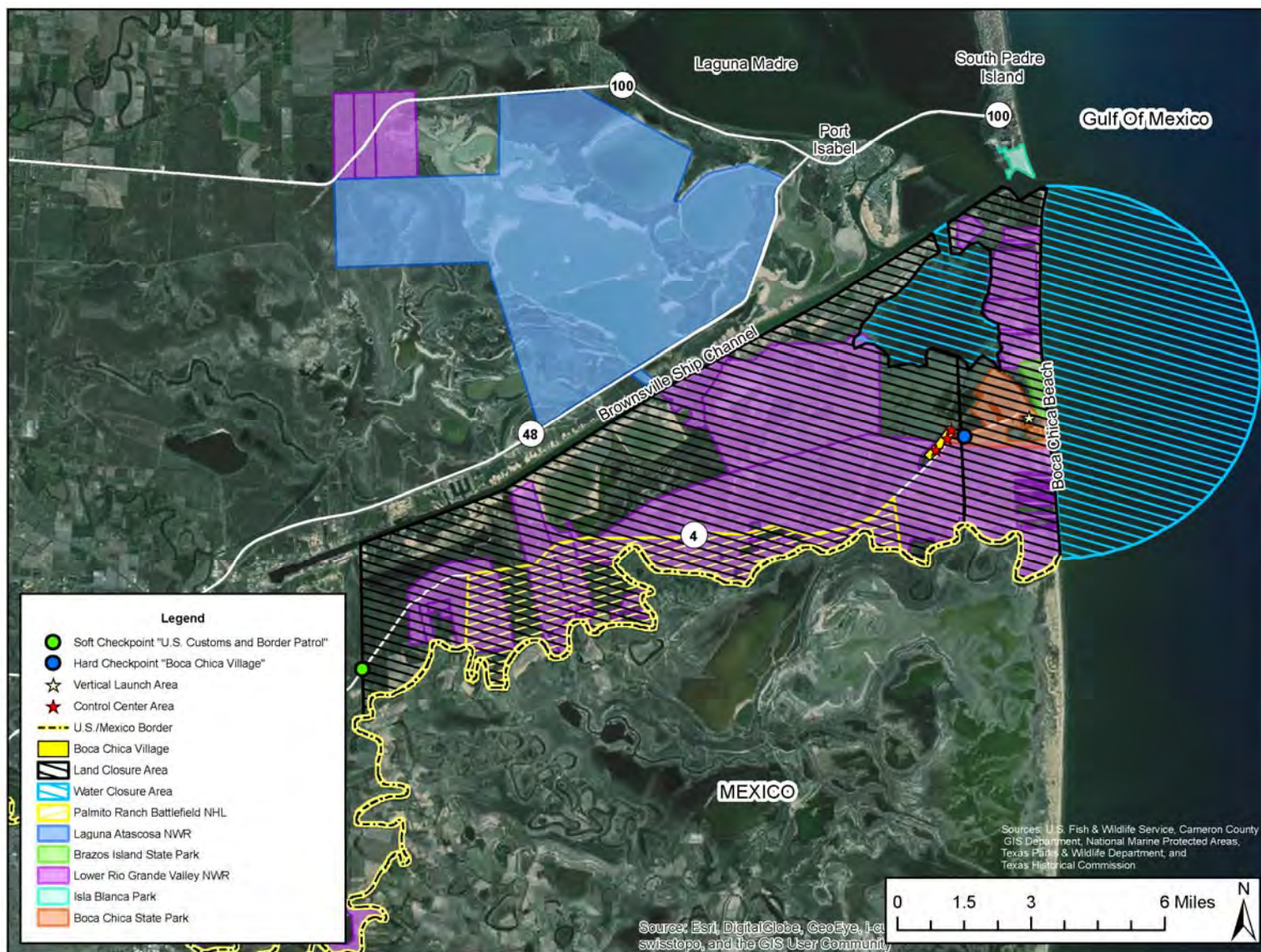
During launch operations, access to the Boca Chica area, including SH 4 and Boca Chica State Park, would be closed to the general public for safety and security reasons (refer to Exhibit A-1). The closures would occur up to 12 times a year for a period of up to 15 hours each time, with 6 hours being the closure time for a nominal launch. The 15-hour closure period allows for potential aborts and contingencies. A closure for a wet dress rehearsal or static fire engine test would be shorter than a closure for a launch. Closures for a wet dress rehearsal or static fire engine test would typically be 3 hours or less. The total number of closures and closure hours for wet dress rehearsals, static fire engine tests, and actual launches would fall within SpaceX's proposed 12 launch operations per year or annual maximum of 180 hours of closure per year.

## **FAA LICENSES, PERMITS, REGULATIONS, AND APPROVALS**

The FAA statutory and regulatory requirements pertaining to commercial launches and individual launch operators are described in 14 CFR Chapter III, Parts 400-450. Under the Proposed Action, SpaceX would be the exclusive user of the site. Therefore, SpaceX is not required to apply for and obtain a Launch Site Operator License (14 CFR Part 420). SpaceX could apply for and obtain the following types of licenses and/or experimental permits:

- Launch-Specific License — “authorizes a licensee to conduct one or more launches, having the same launch parameters, of one type of launch vehicle from one launch site” (14 CFR §Part 415.3[a]). A licensee's authorization to launch terminates upon completion of all launches authorized by the license or the expiration date stated in the license, whichever occurs first.
- Launch Operator License — “authorizes a licensee to conduct launches from one launch site, within a range of launch parameters, of launch vehicles from the same family of vehicles transporting specified classes of payloads” (14 CFR §Part 415.3[b]). A launch operator license remains in effect for five years from the date of issuance.
- Experimental Permit — “authorizes launch and reentry of a reusable suborbital rocket” (14 CFR §Part 437.7). An experimental permit lasts for one year from the date it is issued.

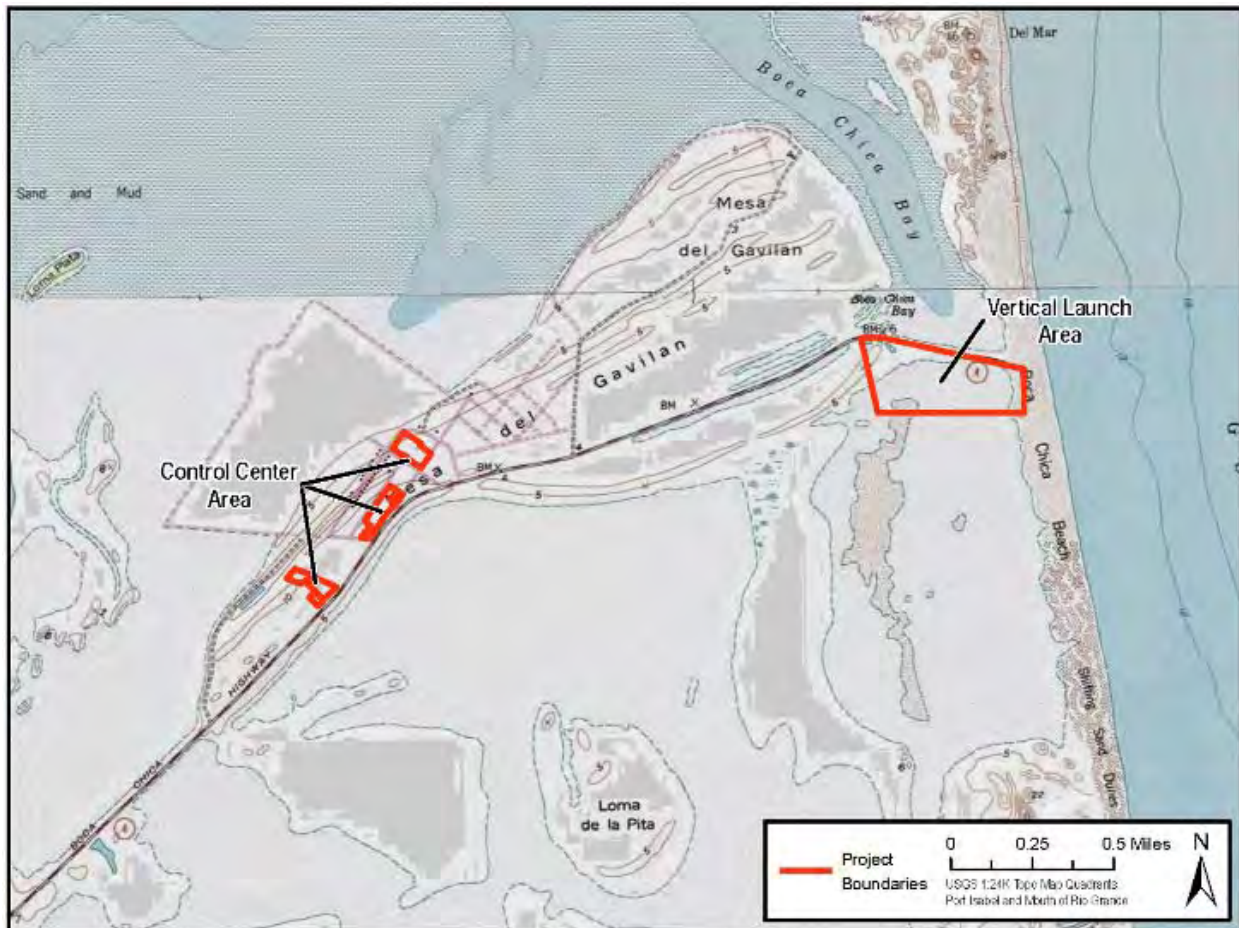
Only those activities and operations under the Proposed Action would be authorized and governed by the FAA through the above licenses and permit. These activities and operations include: construction of a vertical launch area and a control center area; operations to support up to 12 launches per year, including the temporary closure of designated offshore and onshore areas; and the underground installation of a new power line in the right-of-way of SH 4 between the vertical launch and control center areas.



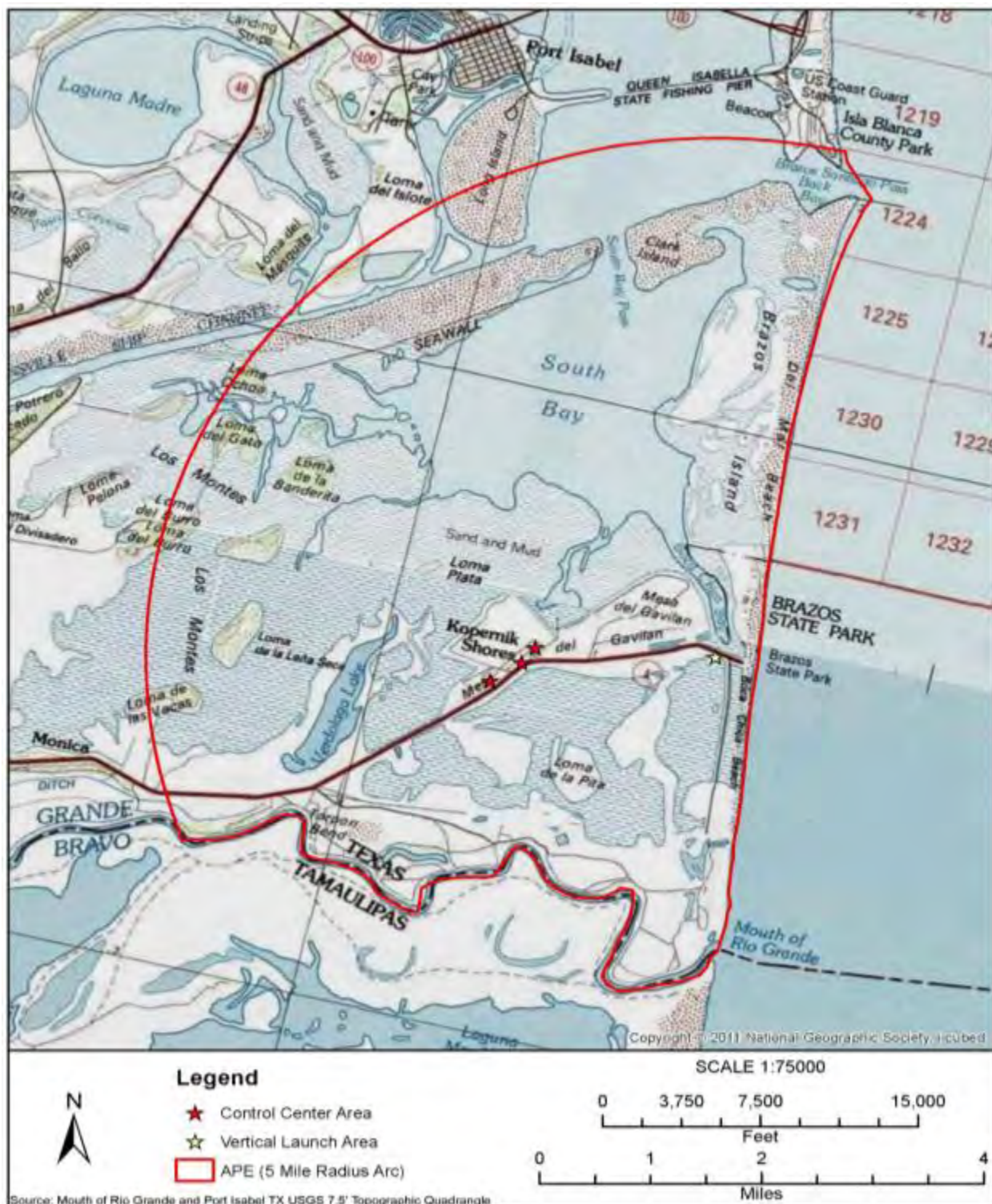
**Exhibit A-1. Proposed Launch Operations Closure Areas**



## ATTACHMENT B. AREA OF POTENTIAL EFFECTS



**Exhibit B-1. Area of Potential Effects for Direct Effects**



**Exhibit B-2. Area of Potential Effects for Indirect Effects**



# ATTACHMENT C. HISTORIC PROPERTIES IDENTIFIED IN THE DIRECT AND INDIRECT APEs

Summary Table of Historic Properties Identified in the APEs for the SpaceX Texas Launch Site.							
Resource #	Resource Name	Site Type	National Register Eligibility	Historic Value	FAA Determination of Effect <sup>1</sup>		
					Direct	Indirect	Secondary (Induced)
41CF93	Palmito Ranch Battlefield NHL	Civil War Battlefield	Listed; Designated an NHL	Landscape, setting, and feeling that contribute to the integrity and interpretation of the site; intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No effect	Adverse effect from visual intrusions to setting and feeling associated with construction	Adverse effect from increased vehicular traffic (i.e., fuel and water trucks) associated with the construction and operation of the facility, as well as from increased foot and vehicular traffic associated with anticipated influx in visitors to the area
41CF4	Brazos Santiago Depot	1840-1870 Military depot and camp	Listed	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No effect	No effect	No effect
41CF6	White's Ranch	Civil War camp	Eligible	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No effect	No effect	No effect

<b>Summary Table of Historic Properties Identified in the APEs for the SpaceX Texas Launch Site.</b>							
<b>Resource #</b>	<b>Resource Name</b>	<b>Site Type</b>	<b>National Register Eligibility</b>	<b>Historic Value</b>	<b>FAA Determination of Effect<sup>1</sup></b>		
					<b>Direct</b>	<b>Indirect</b>	<b>Secondary (Induced)</b>
41CF7	Clarksville	1847-1874 Townsite	Eligible	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No effect	No effect	No effect
41CF19	--	Prehistoric camp	Potentially Eligible	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No effect	No effect	No effect
41CF117.1	Cypress Pilings	1846 Floating bridge pilings	Eligible	Intact physical remains (e.g., features, artifacts, datable materials)	Potential adverse effect from vibration associated with launch operations	No effect	Adverse effect from increased foot and vehicular traffic associated with anticipated influx in visitors to the area
41CF117.2	Pilings Site	Historic campsite	Treated as Eligible	Intact physical remains (e.g., features, artifacts, datable materials)	No effect	No effect	Adverse effect from increased foot and vehicular traffic associated with anticipated influx in visitors to the area
41CF125	Boca Chica Beach Wreck	Shipwreck	Potentially Eligible	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No adverse effect	No effect	No effect

<b>Summary Table of Historic Properties Identified in the APEs for the SpaceX Texas Launch Site.</b>							
<b>Resource #</b>	<b>Resource Name</b>	<b>Site Type</b>	<b>National Register Eligibility</b>	<b>Historic Value</b>	<b>FAA Determination of Effect<sup>1</sup></b>		
					<b>Direct</b>	<b>Indirect</b>	<b>Secondary (Induced)</b>
41CF184	Boca Chica #2	Shipwreck	Potentially Eligible	Intact physical remains (e.g., features, artifacts, datable materials), including potential subsurface remains	No adverse effect	No effect	No effect
No number	Palmetto Pilings	1865 Railroad Pilings	Eligible	Intact physical remains (e.g., features, artifacts, datable materials)	Potential adverse effect from vibration associated with launch operations	No effect	Adverse effect from increased foot and vehicular traffic associated with anticipated influx in visitors to the area
No number	Palmetto Pilings Historical Marker	1936 Granite Marker	Eligible	Associated with the long-standing tradition and one of the largest formal programs of commemoration in the state of Texas	Potential adverse effect from vibration associated with launch operations	No adverse effect	Adverse effect from increased foot and vehicular traffic associated with anticipated influx in visitors to the area

*Note:* 1 Direct Effect = impacts that would have an immediate effect on the physical character of a property, and are primarily associated with construction activities; Indirect Effect = impacts such as visual or auditory that affect more aesthetic aspects of a historic property (e.g., setting); Secondary (Induced) Effect = impacts that are caused by the Undertaking, but occur later in time and/or farther removed in distance, but are foreseeable.

## **ATTACHMENT D. SPACEX TEXAS LAUNCH SITE PLANS**

1. In collaboration with the FAA, SpaceX is developing the following plans:
  - a. Lighting Management Plan
  - b. Facility Design Plan
  - c. Vibration Monitoring Plan
  - d. Unanticipated Discoveries Plan
  - e. Hurricane Plan
  - f. Construction Stormwater Pollution Prevention Plan
  - g. Operation Stormwater Pollution Prevention Plan
  - h. Spill Pollution and Prevention Plan
  - i. Hazardous Materials Emergency Response Plan
  - j. Emergency Action Plan
  - k. Security Plan

## **ATTACHMENT E. SUMMARY OF TRIBAL CONSULTATION AND INVOLVEMENT DURING ENVIRONMENTAL IMPACT STATEMENT DEVELOPMENT AND SECTION 106 PROCESSES FOR THE PROPOSED SPACEX TEXAS LAUNCH SITE**

The FAA identified the following five tribes as having religious or cultural affiliation with the Project area: Apache Tribe of Oklahoma, Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe of New Mexico, and Tonkawa Tribe of Oklahoma. The FAA provided each of them with the following information and opportunities to participate in the Section 106 process:

- The FAA sent consultation letters (dated 2 May 2012) describing the Undertaking and inviting tribes to participate in consultation. The FAA received no response from any of the tribes.
- The FAA sent the *Draft Environmental Impact Statement, SpaceX Texas Launch Site* inviting tribes to comment on the findings of effects on cultural resources. The FAA received no response from any of the tribes.

## **ATTACHMENT F: CONSULTING PARTY CONTACTS**

For the life of this Agreement, each party will provide updates to the list of contacts below, as needed, to the FAA. The FAA will distribute the updated list of contacts to all parties within five (5) business days of receipt of the update.

### **Signatories**

Stacey Zee  
Environmental Protection Specialist  
Federal Aviation Administration  
Office of Commercial Space Transportation  
800 Independence Ave, SW, Suite 325  
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Theresa A. de la Garza  
Project Reviewer – South Texas Region  
Division of Architecture  
Texas Historical Commission  
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Project Leader  
U.S. Fish and Wildlife Service  
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Intermountain Region  
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Deputy Executive Director  
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Najah Duvall-Gabriel  
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Advisory Council on Historic Preservation  
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Washington, DC 20004  
(202) 606-8585