**MEMORANDUM OF 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**
**MITIGATION MEASURES FOR THE CONSTRUCTION AND OPERATION OF THE SPACEX TEXAS LAUNCH SITE, CAMERON COUNTY, TEXAS**

**WHEREAS,** Space Exploration Technologies Corp. (SpaceX) is applying to the Federal Aviation Administration (FAA) Office of Commercial Space Transportation for launch licenses and/or experimental permits 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; and

**WHEREAS**, the licenses and permits would allow launch operations that 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 for up to twelve (12) launch operations a year for a total maximum of 180 hours for the safety and security of the general public; and

**WHEREAS**, the FAA has determined the Project, which requires a federal agency to issue licenses and permits, is an Undertaking pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA; 16 United States Code § 470f), and its implementing regulations, 36 Code of Federal Regulations (CFR) § 800; and

**WHEREAS,** the FAA established the 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 A); and

**WHEREAS,** the FAA completed Section 106 identification of historic properties and determined the Undertaking will adversely affect the following historic properties: Palmito Ranch Battlefield National Historic Landmark (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); 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 the development of a Programmatic Agreement (PA); and

**WHEREAS,** a PA among the FAA, the Texas State Historic Preservation Officer (SHPO), the National Park Service (NPS), the Advisory Council on Historic Preservation (ACHP), SpaceX, U.S. Fish and Wildlife Service (USFWS), and Texas Parks and Wildlife Department (TPWD) was executed on 30 May 2014, 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 consulted with the Signatories (Texas SHPO, NPS, and ACHP), and Invited Signatories (SpaceX, USFWS, and TPWD) to the PA on the resolution of adverse effects and developed this Memorandum of Agreement (MOA) pursuant to Stipulations V.a.i and V.a.ii of the PA;

**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 effect of the Undertaking on historic properties.

## STIPULATIONS

The FAA will ensure that SpaceX will manage, fund, and implement the following measures:

### I. Avoidance, Minimization, and Mitigation Measures for Effects Associated with Construction and Daily Operations

**A. Construction Protection.** SpaceX will place temporary construction barriers around the Marker before construction of the vertical launch area begins to protect the Marker from inadvertent damage from construction vehicles. SpaceX will remove the barriers after construction is complete.

**B. Underground Utility Line Installation.** SpaceX will install all utility lines between the vertical launch and control center areas underground to avoid visual effects to the Palmito Ranch Battlefield NHL.

1. The underground installation of utility lines will occur entirely within SH 4 right-of-way. No archaeological resources were identified in the right-of-way corridor during a 1999 survey. SpaceX will use its Unanticipated Discoveries Plan (see Attachment B) in the event of an inadvertent discovery of archaeological resources.

C. **Compatible Exterior Colors.** SpaceX will work with the Signatories and Invited Signatories on the selection of exterior color schemes for the water tower, lightning protection towers, and other vertical launch area and control center buildings and structures above 30 feet in height to minimize the visual contrast of the facilities in the landscape. SpaceX will select a color scheme using the Bureau of Land Management's Standard Environmental Colors chart, or another color agreed upon by the Signatories of this MOA, and use non-reflective material, to the extent practicable, on the facilities, recognizing the water tower and lightning protection towers may require aircraft markings.

1. Prior to the completion of the final Facility Design Plan for the SpaceX Texas Launch Site, SpaceX will provide a proposal, including visual simulations, on the exterior paint colors and treatments for the facilities to the Texas SHPO and NPS for review and approval. The Texas SHPO and NPS will have thirty (30) calendar days from the date of receipt of the proposal to respond. If no response is received from either the Texas SHPO or NPS by the end of the thirty (30) calendar-day period, then SpaceX may proceed with the proposed exterior paint colors and treatments. The FAA will be copied on all correspondence regarding this decision.

2. Within fifteen (15) calendar days of submission of the exterior color scheme and treatment proposal, the Texas SHPO and/or the NPS may request a conference call with SpaceX to discuss the proposal.

3. If the Texas SHPO, NPS, and SpaceX cannot agree on an appropriate exterior color scheme, then the objecting party will provide written notice to the FAA. The FAA will follow Stipulation X of the PA to resolve the dispute.

4. The agreed-upon exterior paint colors and treatments will be identified on the final facility design drawings to the construction contractor.

5. SpaceX will use the agreed-upon exterior paint colors on any facility that needs to be re-painted.

D. **Noise Reduction of Construction Equipment.** SpaceX will implement the following measures to reduce noise levels generated by operating construction equipment:

1. Baffle boxes, attached muffler, or other functioning noise-abatement methods will be used in accordance with industry standards for construction generators.

2. Quieter equipment or methods, such as choosing equipment with only the necessary size and power, will be used as appropriate unless the quieter options diminish the safety, security, or quality of construction on the site.

3. When available, an observer will be used to direct vehicle backups. At all other times, quieter equipment backup alarms (manually adjustable or broadband) will be used, when practicable.

**E. Minimization of Truck Traffic Noise.** SpaceX will implement the following measures to minimize noise from truck (construction, tanker, concrete, water, delivery) traffic:

1. SpaceX will schedule the majority of truck operations between 8:00 a.m. and 5:00 p.m., Monday through Friday.

2. SpaceX will ensure all trucks utilize mufflers that are in good working condition pursuant to the requirements of existing Federal and state standards (40 CFR § 205 and the Texas Transportation Code Section 547.604). SpaceX will communicate these requirements to contractors and investigate any apparent violations.

3. SpaceX will pursue establishing a groundwater well at the vertical launch area to minimize water truck traffic to the greatest extent possible. The effectiveness of a groundwater well will be evaluated after the well has been constructed.

**F. Historical Context Report.** SpaceX will hire a consultant with relevant professional qualifications as described in Stipulation I.a of the PA to prepare a historical context report (i.e., historical narrative) of the historic events and activities of the Mexican War (1846–1848) and the Civil War (1861–1865) that took place in the geographic area associated with and including the APE. The geographic area of study is bounded, generally, on the north by the Brownsville Ship Channel, on the east by the Gulf Coast, on the south by the Rio Grande, and on the west by the western boundary of the Palmito Ranch Battlefield NHL. The primary purpose of the report is to identify, to the greatest extent possible, the locations and layout of all Mexican War and Civil War activities in the area. These activities include military encampments, troop movements, engagement sites, depots, trails, roads, ports, pilings, and civilian areas. The report will include images of historic and cultural landscape features; images of historic events, people, and sites associated with the Mexican War and Civil War in the area; and detailed maps showing the locations of all Mexican War and Civil War activities in the area. In developing the report, the consultant will conduct additional research, including primary and secondary source materials, to supplement and augment the historic contexts already developed for the archaeological and architectural investigations for this Undertaking. NPS will provide SpaceX a draft scope of work for this report.

The FAA, Texas SHPO, and NPS must approve the selection of the contractor who will conduct this research. SpaceX will submit a draft of the report to the FAA, Texas SHPO, and NPS for their review and comment. The FAA, Texas SHPO, and NPS will have thirty (30) calendar days from the date of receipt to provide comments.

SpaceX will take all comments into consideration when updating the report. SpaceX will distribute the revised report to the FAA, Texas SHPO, and NPS for a fifteen (15) calendar day review period. SpaceX will take all comments into consideration and submit a final report. SpaceX may proceed with submitting the final report if the Texas SHPO and NPS do not provide comments within thirty (30) calendar days from receipt of the first draft. SpaceX will provide one (1) paper copy and an electronic version of the final report to the FAA, Texas SHPO, and NPS within one (1) year of execution of this MOA.

## II. Avoidance, Minimization, and Mitigation Measures for Effects Associated with Launch Operations

**A. Soft Checkpoint Location.** SpaceX will establish the soft checkpoint closure area west of the existing U.S. Customs and Border Protection checkpoint at a location east of where SH 1419 crosses SH 4 and west of where an unnamed north-south canal crosses SH 4, as generally depicted in Attachment C, to include the entire extent of the Palmito Ranch Battlefield NHL.

**B. Flame Duct Orientation.** SpaceX will orient the flame duct east-southeast to direct the heat and combustion products and the initial sound blast away from the Marker, the Cypress Pilings, the Palmetto Pilings, and the Pilings Camp Site.

**C. Vibration Monitoring of the Marker.** SpaceX will ensure a vibration monitoring program is conducted. The purpose of the monitoring program is to gather data on the effects on the Marker from vibration due to launch operations, and address any structural damage appropriately. SpaceX will hire a qualified professional to undertake a pre-launch condition assessment of the Marker and an appropriately qualified engineer with experience in vibro-accoustic measurement to take baseline vibration levels. The results of the pre-launch condition assessment will be used to develop a monitoring plan prior to the first launch event. Should the pre-launch condition assessment find that the Marker is unlikely to withstand any elevated levels of vibration, it will be stabilized following the Secretary of the Interior's *Standards for the Treatment of Historic Properties* so that its historic fabric is not damaged and its character-defining features are not altered. Any proposed stabilization and protection measures will be subject to the review process described in Stipulation III of the PA.

The monitoring plan will be subject to the review process described in Stipulation III of the PA. SpaceX will hire one or more qualified engineers to take vibro-acoustic measurements during each of the first five (5) launch events, including a minimum of one (1) launch of a Falcon Heavy vehicle. A qualified professional will assess the condition of the Marker after each launch. A report will be generated to document the findings of the vibro-acoustic monitoring and condition assessment after each launch. The report will be subject to the review process as described in Stipulation III of the PA.

1. The monitoring program will be discontinued after monitoring the first five (5) launch events and one (1) Falcon Heavy launch event if no changes in the condition or stability of the Marker are noted.

2. If the results of the monitoring after any of the five (5) launches and one (1) Falcon Heavy launch indicate risk of physical damage to the Marker from vibration, then SpaceX will hire a qualified professional to make recommendations for the stabilization and protection of the Marker. Should permanent stabilization be necessary, it will be done following the Secretary of the Interior's *Standards for the Treatment of Historic Properties.* The proposed stabilization and protection measures will be subject to the review process described in Stipulation III of the PA.

**D. Replication of Missing Marker Elements.** SpaceX will pay for the replication and installation of the missing star and wreath on the Marker. Prior to installation of the missing star and wreath, the Marker will be photo-documented, following the National Register Photo Policy update of 15 May 2013. The CD-R Archival Gold disk will be submitted to the Texas SHPO. The missing star and wreath will be installed within ninety (90) days after the vibration monitoring program is completed. Within thirty (30) days of the installation of the star and wreath, photo-documentation of the Marker will be submitted to the FAA and the Texas SHPO as evidence of the completion of this stipulation. Digital photographs submitted via e-mail will be acceptable.

**E. Documentation of the Cypress Pilings and Palmetto Pilings.** SpaceX will hire a consultant with relevant professional qualifications as described in Stipulation I.a of the PA to undertake documentation of the remains of the Cypress Pilings and Palmetto Pilings before the first launch event. The pilings are situated on land owned by the State of Texas; therefore, an Antiquities Permit issued by the Texas SHPO must be obtained by the consultant before work may proceed. The consultant will submit a detailed scope of work with the permit application that includes a rationale for the type and level of documentation proposed and the kinds of analysis proposed. The consultant will coordinate with the USFWS and TPWD for site access after obtaining an Antiquities Permit from the Texas SHPO. All the 1846 land-based pilings (approximately 20) and up to 40 of the 1865 land-based pilings within the 5-mile radius APE will be inventoried, mapped, and photographed. The inventory will record the height, width (diameter), attitude (deviation from vertical), and any associated features or artifacts. A GPS unit with submeter accuracy will be used to map the pilings. The GPS data will be differentially corrected. The photography will follow the standards contained in the National Register Photo Policy Factsheet (updated 15 May 2013).

1. The qualified consultant will prepare a report that includes detailed descriptions of each set of pilings and their respective history and significance. The report will also include the following supplemental documentation: a Texas site form (TexSite Archeological Site Data Form),

including all required attachments, for each set of pilings; site maps; and photographs.

2. SpaceX will submit a draft of the report to the Texas SHPO and FAA for their review and comment. SpaceX may proceed with submitting the final copy of the report if the Texas SHPO does not provide comments within thirty (30) calendar days from receipt of the draft. Within six (6) months of the end of the 30-day review period, SpaceX will provide one (1) paper copy and an electronic version of the final report to SHPO, FAA, USFWS, and TPWD and will submit one archival copy of the site forms to the Texas Archaeological Research Lab (TARL). SpaceX will also provide an electronic copy of the report in PDF format on two (2) CDs to TPWD.

## III. Avoidance, Minimization, and Mitigation Measures for Secondary (Induced) Effects Associated with the Undertaking

**A. Additional Security.** SpaceX will fund a GS-12 full-time security position at the USFWS South Texas Refuge Complex who will be in charge of maintaining security throughout the neighboring Lower Rio Grande Valley National Wildlife Refuge. The position will be filled prior to the first launch and in place for the life of the SpaceX Texas Launch Site. This employee will work year-round for the USFWS, independently of whether launch activities are occurring. One of the primary job functions of the position will be to secure the Refuge land included in or adjoining the historic properties during each closure period for launch operations.

**B. Replication of Palmito Ranch Marker.** SpaceX will pay for the replication of the Palmito Ranch historical marker using a foundry recommended by the Texas SHPO. The replicated marker will be installed at or as close to its original location as possible within two (2) years of execution of this MOA. Within thirty (30) days of its installation, photo-documentation of the new historical marker will be submitted to the FAA and the Texas SHPO as evidence of the completion of this stipulation. Digital photographs submitted via e-mail will be acceptable.

**C. Interpretive Signage.** SpaceX will fund the development and production of five (5) interpretive signs that describe the history and significance of the historic properties in the APE, including the Pilings Camp Site. The content of the signs will be developed by a qualified historian and may include information obtained in Stipulation I.F. NPS and USFWS will collaborate on the design and materials of the signs to be consistent with their existing signage. NPS will prepare the scope of work for the design and content of interpretive signage, a list of qualified contractors, and the basic materials to SpaceX.

1. SpaceX will provide the preliminary plans for the design and content of the signs to the Texas SHPO for review and comment. SpaceX may proceed with the production of the signs if the Texas SHPO does not provide comments within thirty (30) calendar days from receipt of the design plans.

2. SpaceX will have the signs produced by a qualified contractor identified by NPS during construction so that they can be installed immediately after construction is completed, and prior to operation, or within one (1) year from the receipt of the scope of work from NPS, should it be received after construction has been completed.

3. The locations for installing the interpretive signs will be determined in consultation with the Texas SHPO, NPS, and USFWS.

4. Within thirty (30) days of installation, photo-documentation of the interpretive signs will be submitted to the FAA and the Texas SHPO as evidence of fulfillment of this stipulation. Digital photographs submitted via e-mail will be acceptable.

**D. Educational Website.** SpaceX will design, develop, host, and maintain an educational website. The website will include sections on the historic properties in the APE; SpaceX's planned and ongoing avoidance, minimization, and mitigation of effects to natural and cultural resources; National Wildlife Refuge awareness; the space program; and the launch schedule of the SpaceX Texas Launch Site, including launch closure information and times. SpaceX will post the completed historical context report (with redactions to protect the integrity of archaeological sites), developed in Stipulation I.F, on the website. SpaceX also will use the information obtained in Stipulation I.F to develop the website content. SpaceX will coordinate with the SHPO and NPS regarding content related to the historic properties within the APE, and with the USFWS regarding content related to the Lower Rio Grande Valley National Wildlife Refuge.

1. The website will be on line within one (1) year from the execution of this MOA. SpaceX will maintain the website for the life of the SpaceX Texas Launch Site.

## IV. Post-Review Discoveries

If potential historic properties are discovered or unanticipated effects on historic properties are identified during implementation of any action taken pursuant to this MOA, SpaceX will implement the Unanticipated Discoveries Plan included in Attachment B to this MOA.

## V. Monitoring and Reporting

**A.** Within three (3) months following the execution of this MOA, SpaceX will provide a schedule for tracking the progress of implementation of all mitigation measures and an estimated date for the completion of all construction activities for FAA's review. Upon approval, FAA will provide the schedule to all Signatories and Invited Signatories. SpaceX will update the schedule when necessary, and submit it

to FAA. The FAA will forward any schedule adjustments to the Signatories and Invited Signatories. Such scheduling changes will not necessitate revision to the MOA. SpaceX will provide written notice to all Signatories and Invited Signatories of the date of the completion of all construction activities.

**B.** Every six (6) months following the execution of this MOA until it expires or is terminated, SpaceX will provide the FAA a summary report detailing work carried out pursuant to its terms and an updated schedule, if necessary. The FAA will review the report within thirty (30) calendar days. Upon approval, the FAA will provide the summary report to all Signatories and Invited Signatories to this MOA. Such report will include any scheduling changes proposed, any problems encountered, and any disputes and objections received on the efforts to carry out the terms of this MOA.

**C.** For the life of this MOA, the FAA will coordinate a meeting of the Signatories and Invited Signatories to discuss activities carried out pursuant to this MOA during the preceding year and activities scheduled for the upcoming year. The meeting will be scheduled to coincide with the scheduled annual meeting described in Stipulation IX.b of the PA.

## VI. Dispute Resolution

Should any Signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the FAA will consult with the Signatory to resolve the objection. If the FAA determines that such objection cannot be resolved, then the FAA will follow Stipulation X of the PA to resolve the dispute.

## VII. Duration, Amendments, and Termination

A. This MOA 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 MOA for an additional period of time.

B. Any Signatory or Invited Signatory to this MOA may request the other Signatories and Invited Signatories consider amending it, in which case the parties will consult to consider the proposed amendment(s). This MOA may be amended when such an amendment is agreed to in writing by all the Signatories and Invited Signatories. The amendment will be effective on the date a copy is signed by all the Signatories and Invited Signatories and is filed with the ACHP.

C. If any Signatory or Invited Signatory to this MOA 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 VII.B of this MOA. 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 MOA upon written notification to the other Signatories and Invited Signatories. This MOA may also be terminated by the execution of a subsequent MOA that explicitly terminates and/or supersedes its terms.

Execution of this MOA 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.

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**SPACE EXPLORATION TECHNOLOGIES CORP.,**
**UNITED STATES FISH AND WILDLIFE SERVICE, AND**
**TEXAS PARKS AND WILDLIFE DEPARTMENT,**
**REGARDING**
**MITIGATION MEASURES FOR THE CONSTRUCTION AND OPERATION OF THE SPACEX TEXAS LAUNCH SITE, CAMERON COUNTY, TEXAS**

**FEDERAL AVIATION ADMINISTRATION**

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

Date: December 19, 2014

**SIGNATORY PAGE**

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**TEXAS STATE HISTORIC PRESERVATION OFFICER**

By: Mark Wolfe
Mark Wolfe
State Historic Preservation Officer

Date: 12/15/14

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**NATIONAL PARK SERVICE**

By: Laura E. Joss
for Sue E. Masica
Director, Intermountain Region

Date: Dec. 19, 2014

**SIGNATORY PAGE**

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**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

By: John M. Fowler

John M. Fowler
Executive Director

Date: 1/5/15

**INVITED SIGNATORY PAGE**

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**SPACE EXPLORATION TECHNOLOGIES CORP.**

By: _____
Steven Davis
Director of Advanced Projects

Date: 12/11/14

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**UNITED STATES FISH AND WILDLIFE SERVICE**

By: _____
Aaron M. Archibeque
Regional Chief, National Wildlife Refuge System

Date: _____

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**TEXAS PARKS AND WILDLIFE DEPARTMENT**

By: _____
Ross Melinchuk
Deputy Executive Director – Natural Resources

Date: _____

## Attachment A. Area of Potential Effects

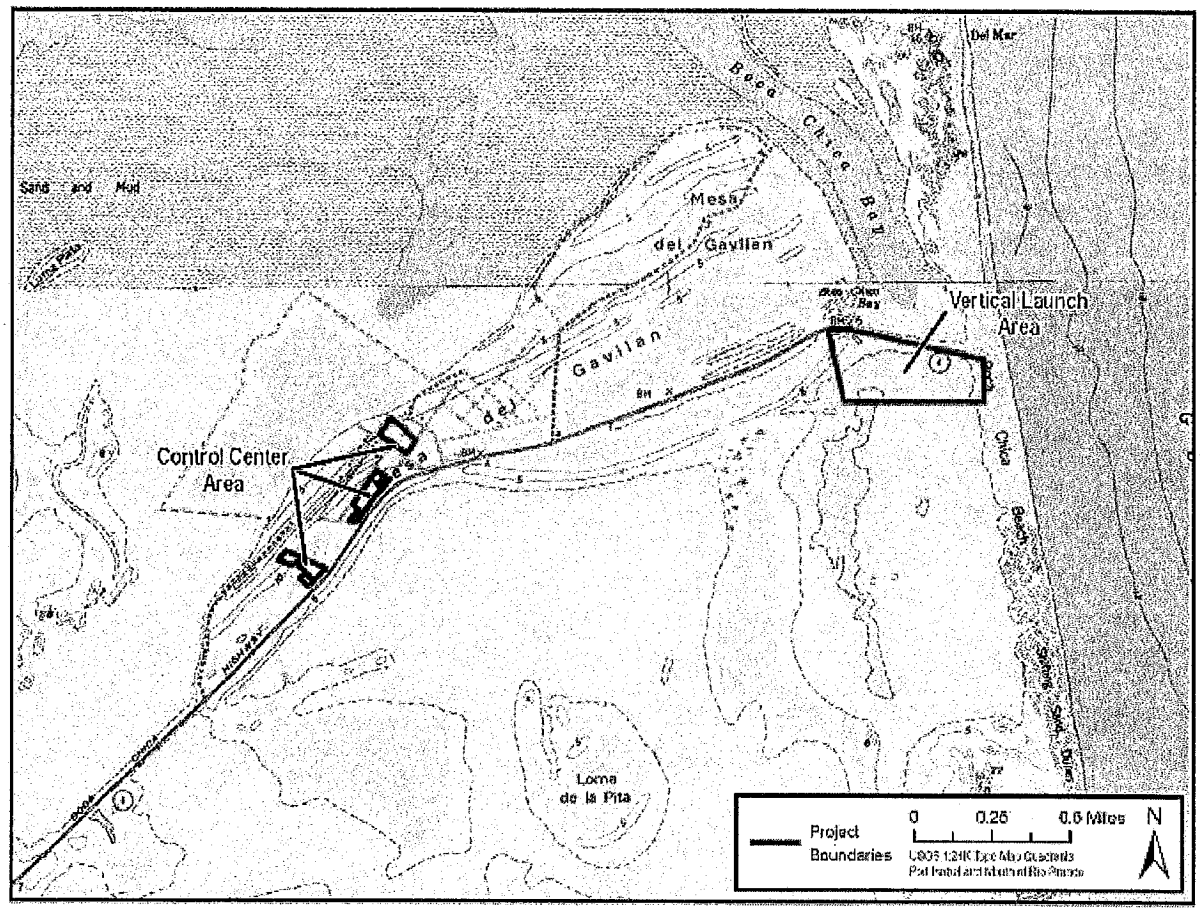


**Exhibit A-1. Area of Potential Effects for Direct Effects**

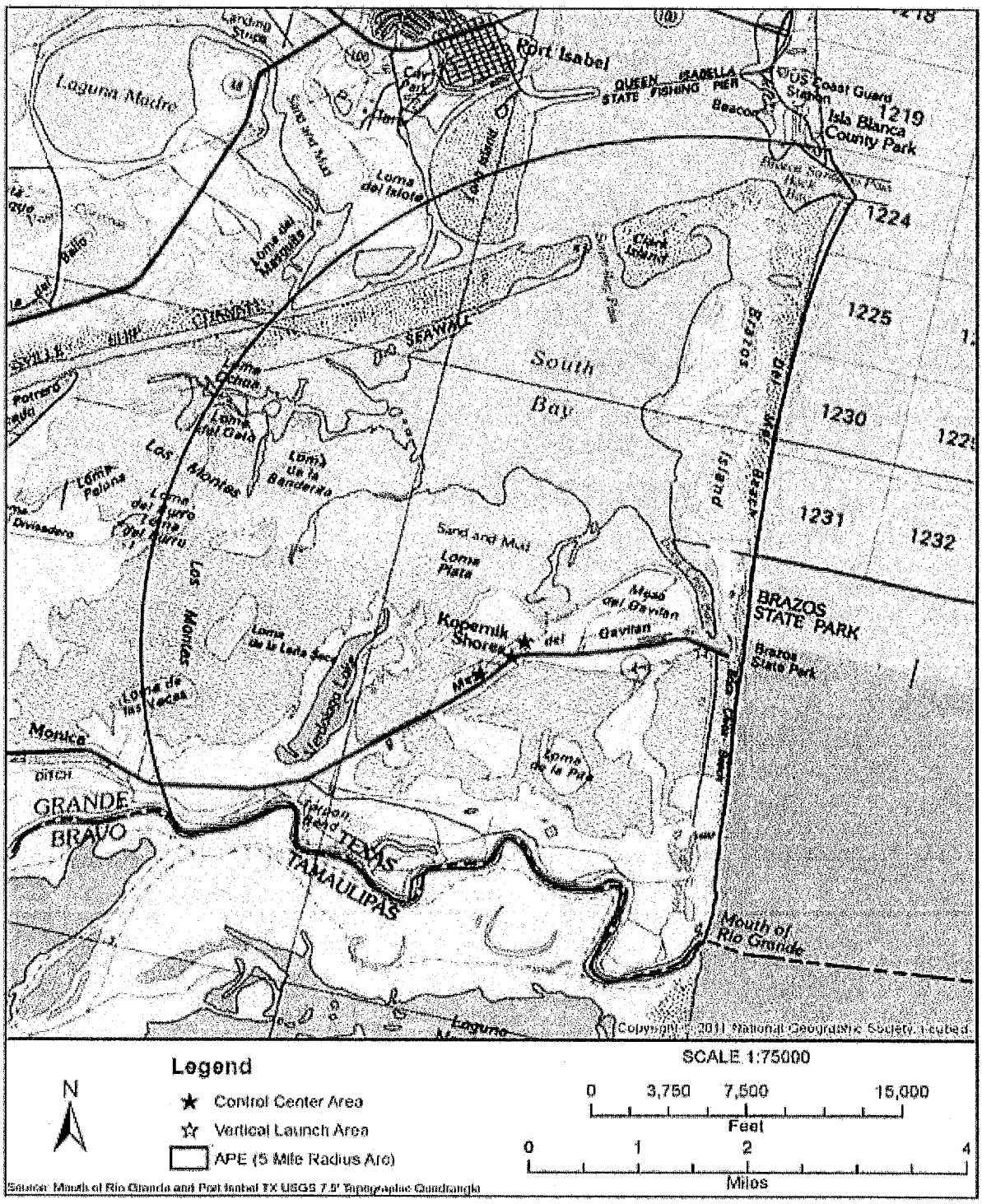


**Exhibit A-2. Area of Potential Effects for Indirect Effects**

SPACEX

# SpaceX Texas Launch Site

# Unanticipated Discoveries Plan

Revision 8

October 2014

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**Space Exploration Technologies Proprietary**

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# 1.0 Introduction

Space Exploration Technologies Corp. (SpaceX) plans to construct and operate a private launch site on privately owned property in Cameron County, Texas. The facility will consist of two operational areas: one for the launch site itself (the vertical launch area) and one for remote command and control of the launch activity (the control center area).

Proposed facility and infrastructure construction at the vertical launch area would include the following:

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

The approximate 56.5-acre vertical launch area is located approximately 5 miles south of Port Isabel and South Padre Island, approximately 18 miles east of Brownsville, and approximately 3 miles north of the U.S./Mexico border on the Gulf Coast of Texas. It is adjacent to the eastern terminus of State Highway 4 (Boca Chica Boulevard) and immediately south of Brazos State Park.

The proposed control center area is located adjacent to Boca Chica Village, approximately 2 miles west of the proposed vertical launch area and north of Boca Chica Boulevard. The control center area is located on approximately 10 acres of contiguous property and will include the following:

- Launch control center building
- Payload processing facility
- Launch vehicle processing hangar
- RF transmitter/receiver
- Generator and diesel storage facility
- Roads, parking areas, fencing, security, lighting, and utilities
- A satellite fuels storage facility

SpaceX intends to support up to 12 commercial launch operations per year from this facility. Launch operations include not only launches, but also pre-flight activities such as mission rehearsals and static fire engine tests. In compliance with the National Environmental Policy Act, the Federal Aviation Administration (FAA) has prepared an Environmental Impact Statement (EIS) for the SpaceX Texas Launch Site. In compliance with Section 106 of the National Historic Preservation Act, an extensive cultural resource investigation was undertaken

in support of the EIS. The investigation included extensive records searches; an intensive architectural survey of a 5-mile radius area of potential effects (APE) for indirect effects (*Architectural Resources Investigation for the Proposed SpaceX Texas Launch Site, Cameron County, Texas* 2013); an intensive archaeological survey of the APE for direct effects (the vertical launch and control center areas), a metal detection survey of the control center area (*Archaeological Resources Investigation for the Proposed SpaceX Texas Launch Site, Cameron County, Texas* 2013) and a metal detection survey of additional launch control property (*Metal Detector Survey, SpaceX Launch Control Center, Cameron County, Texas 2014)*

The intensive archaeological investigation resulted in one historic archaeological site (41CF217) and 19 isolated finds being recorded within the APE for direct effects. In consultation with the Texas State Historic Preservation Officer (SHPO), the FAA determined all 20 resources were not eligible for listing in the National Register of Historic Places (NRHP). However, 11 historic properties were identified within the APE for indirect effects. Six of the properties are associated with the historic activities surrounding the U.S.-Mexican War (1846-1848) and the U.S. Civil War (1861-1865). Two are shipwrecks on Boca Chica Beach that are potentially eligible for listing on the NRHP and have been designated State Antiquities Landmarks. Other historic properties include a historic town site, a prehistoric campsite, and a historical marker. The FAA and Texas SHPO determined the construction of the vertical launch and control center areas would adversely affect five historic properties in the APE for indirect effects. A Programmatic Agreement (PA) was executed by the FAA, Texas SHPO, National Park Service, Advisory Council on Historic Preservation, SpaceX, U.S. Fish and Wildlife Service, and Texas Parks and Wildlife Department. The FAA, Texas SHPO, and the other consulting parties are developing a Memorandum of Agreement to mitigate the adverse effects on the historic properties.

Although the Proposed Action would have no effect on any historic properties within the direct effects APE and no further work is recommended there, four of the historic properties are within 1,000 feet of the vertical launch area. Consequently, there is the potential for undetected archaeological materials associated with historic and prehistoric activities to be discovered during ground-disturbing activities associated with construction of SpaceX facilities. While archaeological monitoring was not recommended in the 2013 Archaeological Resources Investigation report or in the final EIS, given the number of historic properties in the area, including four within 1,000 feet of the vertical launch area, the PA stipulated the development of an unanticipated discoveries plan. SpaceX presents this plan in order to describe the procedures that will be followed in the event of unanticipated discoveries of human remains and/or other cultural resources during the course of project construction.

# 2.0 Discovery Procedures

The following procedures will be followed in the event of an unanticipated discovery of a cultural resource during construction activities, or during operation of the SpaceX Texas Launch Site, as defined in 36 CFR §800.13. For the purposes of this plan, an "unanticipated discovery" is defined as the unexpected revelation of concentrated associations of cultural materials and/or human remains within a limited area that meet the definition of an archaeological site in Chapter 26 of the Antiquities Code of Texas.

Widely scattered, isolated occurrences of cultural materials that are characterized by solitary artifacts or sparse, insignificant groupings of artifacts within a given space are considered isolated finds. These types of finds lack the capacity to yield information important to human history and cultures. Any discoveries a qualified professional determines as meeting the definition of an isolated find will not be considered discoveries and will only be subject to the following initial procedures for unanticipated discoveries.

A variety of cultural resources could be inadvertently discovered during construction activities at the vertical launch and control center areas based on the known cultural history of the area and identified cultural resources located nearby. All ground-disturbing activities will be within the direct APE; the contractor will not conduct any ground-disturbing activities outside of this APE, including the grading of access roads or at material borrow or disposal sites. Prehistoric resources may include, but not be limited to, resource procurement sites, open camps, and burials. Anticipated historic resources include military camps, battle sites, unmarked graves, homesteads and ranches, dumps, and trash scatters. The remains of a late 19th or early 20th century homestead or ranch (41CF217) was previously documented at the west end of the proposed vertical launch area. Additional cultural materials associated with this site, such as metal, glass, and ceramic artifacts as well as scattered building materials, are likely to be uncovered during ground disturbing activities. Building foundations or structural remains, while not identified during the 2013 archaeological survey of the vertical launch area, also could be present within the construction area. If additional cultural materials similar to that found previously associated with Site 41CF217 are uncovered during construction, they will not be considered a discovery and the procedures outlined below for discoveries would not apply. Non-significant cultural materials uncovered will be noted and mapped, and a revised site form will be submitted to the Texas Archaeological Research Lab (TARL). No artifacts will be collected. If intact structural remains or building foundations are uncovered or indications of significant intact cultural remains are detected, they will be considered a discovery and the procedures for discoveries outlined below will be followed.

## 2.1 Training

Prior to ground-disturbing activities, a cultural resource education program for construction personnel and all other on-site personnel will be designed and implemented by SpaceX's contracted Cultural Resources Specialist (CRS), who will be a professionally qualified

archaeologist as defined in the PA. The education program will include a review of the specific site types of resources potentially located within the vertical launch and control center areas. The CRS will provide a reference sheet depicting the most likely kinds of resources that may be uncovered, and what resources may be associated with Site 41CF217 and therefore are not considered discoveries and do not require following the procedures outlined below for discoveries.

Also, prior to commencement of construction, a meeting will occur between the CRS, SpaceX's Field Contact Representative (FCR), and the contractor's construction supervisor to outline SpaceX's cultural resources compliance commitments and the procedures and protocol outlined in this plan, including stop-work orders, location confidentiality, and if archaeological deposits or human remains are encountered. Additionally, the CRS will train the FCR on how to prepare a TARL should any non-potentially significant materials associated with Site 41CF217 be uncovered.

SpaceX's FCR will ensure that training will be repeated as needed so all construction personnel are aware of what kinds of artifacts may be encountered during ground-disturbing activities and what the protocols and procedures are, should there be any discoveries. The contractor's construction supervisor will be responsible for ensuring that all construction crew members adhere to the guidelines and restrictions outlined in the program.

## 2.2 Stop Activities and Protect the Discovery

This section presents the initial protocols to be followed in the event of an unanticipated discovery of archaeological resources or human remains. A list of key individuals to contact in the event of an unanticipated discovery and their contact information is provided in Attachment A.

Upon discovery of non-isolated cultural materials, and/or features, or any human remains, the on-site FCR (or the contractor's construction supervisor) will be notified immediately, and all activity within a 50-meter construction buffer zone of the discovery will stop. The area of the discovery will be secured by the FCR or construction supervisor and all reasonable efforts will be taken to avoid and protect the identified cultural materials or human remains. These efforts will include clearing construction personnel, flagging or otherwise marking off a 50-meter construction buffer zone around the discovery area, and discontinuing any further ground disturbing activity within the flagged/marked area. The FCR would have the discretion to authorize limited actions within the area of discovery in order to protect life and property if strictly necessitated by safety concerns.

The FCR will notify SpaceX management and the CRS immediately, and the CRS will have 24 hours in which to evaluate the discovery to determine the nature of the find (e.g., a potentially eligible cultural property, human remains/grave goods, sacred objects, etc.), and implement additional protection measures as necessary to prevent further harm to the cultural resource. The FCR will ensure that crews do not resume work until the CRS determines if it is in primary depositional context, is an isolated find, or if it is an archaeological resource. The CRS will photograph and describe the discovery and document its location. If the discovery is

determined not to be an archaeological resource by the CRS, project-related ground disturbance may continue in the location of the discovery.

## 2.3 Make Notifications

Should the CRS determine that the discovery is an archaeological resource, SpaceX management, in coordination with the CRS, will notify the FAA, Texas SHPO, and Native American tribes immediately upon determination that a protected or previously unidentified cultural resource has been, or could be, inadvertently affected by the construction activities or site operations. The FAA will notify the PA Signatories and Invited Signatories within seven days.

If the discovered materials are determined or suspected to include human remains, SpaceX management will immediately contact the Cameron County Sheriff's Department and the provisions of Texas state law for unidentified human remains will be strictly followed (refer to Section 3.0).

## 2.4 Determinations, Evaluations, and Assessment

If the discovery is determined to be an archaeological resource, protection measures will be determined through discussion between SpaceX, FAA, and Texas SHPO and implemented as soon as possible. The CRS will determine the boundary of the discovery within seven days, if possible, and allow ground disturbing activities to continue within 30 meters of the site boundary. Of particular importance will be a determination of whether the discovery includes human remains (if not already determined). If the discovery is determined to comprise human remains, the additional provisions described in Section 3.0 will be followed.

For the discovery of other cultural materials, including historic period artifacts, funerary objects, sacred objects, or objects of cultural patrimony, the CRS will document the discovery to Texas SHPO standards, evaluate it for NRHP eligibility in accordance with 36 CFR 800.4(c), and provide a report to the FAA that meets Texas SHPO and Council of Texas Archaeologists standards. The report will be provided to the FAA within 30 days of the discovery. Upon approval of the report, the FAA will distribute the report to the PA Signatories and Invited Signatories.

The FAA will consult with the Texas SHPO and any affected Native American tribe on the NRHP eligibility determination. This consultation will be completed within 30 days.

If the FAA determines, in consultation with the Texas SHPO and any affected Native American tribe, that the discovery is not a historic property, the FAA will notify SpaceX that activities in the area of the discovery may resume immediately.

If the FAA determines the discovery is a historic property, a determination of effects will be made by the FAA within 10 days in consultation with the Texas SHPO and any affected Native American tribe in accordance with 36 CFR §800.5. The FAA will report the determination to all PA Signatories and Invited Signatories within 10 days of the determination.

Adverse effects will be resolved by the FAA in consultation with the Texas SHPO following the procedures and timeframes set forth in 36 CFR §800.6. The FAA will ensure the PA Signatories and Invited Signatories are involved in the discussions of the proposed treatment plan. SpaceX will be responsible for the preparation of a treatment plan for adverse effects to any historic property that is discovered during construction. The treatments recommended will depend upon the nature of the discovery, its type and level of significance, the nature of the effect, and the disposition of any archaeological materials removed during the investigation. The treatment may consist of avoidance and protection if possible, removal of the find, additional test excavations, and/or data recovery. The plan will be completed within 14 days from the completion of the resolution of adverse effects coordination.

If the site cannot be avoided or otherwise protected, the treatment may consist of removal of the find. SpaceX will ensure that excavations are performed in accordance with the standards and methods outlined in the plan and approved by the FAA and Texas SHPO. Following the removal of the find, SpaceX is authorized to resume construction in the area immediately. The FAA will send a letter within 10 days of the plan consensus to all the PA Signatories and Invited Signatories detailing the results of the coordination and the actions taken.

If the FAA determines that additional test excavations and/or data recovery are warranted, SpaceX will prepare a testing/data recovery plan and submit it to the FAA, Texas SHPO, and any affected Native American tribe for review. The testing/data recovery plan will be completed within 14 days of the determination that additional investigation is warranted.

Upon approval of the plan, SpaceX will arrange for a professional archaeological excavation crew to be on the site as soon as practicably possible. Excavations would be performed in accordance with the standards and methods approved by the FAA and Texas SHPO. Since the area may have already been partially disturbed by construction activities, the objective of a testing or data recovery plan will be to recover data quickly in order to evaluate the find's significance. If the approved plan recommends full data recovery, in coordination with the FAA and Texas SHPO, SpaceX will be authorized to resume construction in the area immediately following the completion of data recovery efforts.

If the additional data is needed to facilitate the decision making process, SpaceX will submit a report presenting the finding of the additional investigations within 14 days of the completion of the excavation.

If, based on the results of the additional test excavations and/or data recovery, the FAA determines in consultation with the Texas SHPO and any affected Native American tribe that the discovery is not a historic property, and/or there is no adverse effect, and/or adverse effects have been sufficiently addressed, the FAA will notify SpaceX that activities in the area of the discovery may resume after its received written concurrence from the Texas SHPO.

In addition, within 10 days of the determination, the FAA will send a letter to all the PA Signatories and Invited Signatories detailing the results of the archaeological investigation and the actions taken.

# 3.0 Human Remains

Because the project site is not located on Federal or Tribal lands, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), as outlined in 43 CFR Part 10, does not apply. Alternative procedures for the discovery of human remains are outlined below. The initial process of contacting the CRS when a potential archaeological resource is discovered is as outlined in section 2.0 will be followed.

Upon determination by the CRS that a discovery is or includes human remains, the Cameron County Sheriff's Department will be notified immediately and the area around the remains will be secured by the FCR or contractor's construction supervisor. At all times human remains must be treated with the utmost dignity and respect. Should human remains and/or funerary objects, sacred objects, or objects of cultural patrimony be encountered, construction in the area of the discovery will stop immediately, and the location will be immediately secured and protected from damage and disturbance. The human remains and any associated objects, sacred objects, and objects of cultural patrimony will be left in place and not disturbed.

Chapters 711-715 of the Texas Health and Safety Code will be followed. SpaceX/FAA will notify the County Clerk of the discovery of an unknown cemetery within 10 days of the discovery. If it is determined that the human remains are to be disinterred, a permit will be obtained from the State Registrar with the Texas Department of State Health Services (Note a permit is not required if the remains are to be reinterred on the same property, which is considered to be moving the remains within the same cemetery under the Health and Safety Code).

Cameron County law enforcement officials will make a determination on the nature of the human remains, as either forensic or archaeological. If it is determined the remains are non-archaeological and the area is a potential crime scene, then legal authorities will complete their investigation of the site and take possession of the remains. If the remains are determined to be archaeological, they will be left in place and protected from further disturbance until a plan for their avoidance or removal can be formulated by SpaceX and the CRS in consultation with the FAA, Texas SHPO, and affected Native American tribe. The FAA will notify all PA Signatories and Invited Signatories of the find. A coordination meeting will be held within 48 hours of the determination that the remains are archeological. Participants will include the FAA, Texas SHPO, SpaceX, and any potentially affected Native American tribes. The FAA will notify all PA Signatories and Invited Signatories of the outcome of the meeting.

Following the meeting, the CRS will document the discovery to Texas SHPO standards and provide a treatment plan to the FAA that meets Texas SHPO and Council of Texas Archaeologists standards within 14 days of the discovery. The treatment plan will include measures to address any adverse impacts to the human remains and recommendations for the management of the remains which will include either avoidance or removal. The FAA will ensure that all PA Signatories and Invited Signatories are involved in the discussions and aware of the proposed treatment plan.

The FAA, Texas SHPO, and any potentially affected Native American tribes will have 14 days to review the treatment plan.

Following consensus, SpaceX will implement the agreed upon treatment. If the treatment consists of removal of human remains, SpaceX will ensure that excavations would be performed in accordance with the standards and methods approved by the FAA and Texas SHPO. Following the removal of the human remains, SpaceX is authorized to resume construction in the area immediately. The FAA will send a letter within 10 days of the plan consensus to all the PA Signatories and Invited Signatories detailing the results of the coordination and the actions taken. If, following review of the plan, the FAA determines that additional data recovery efforts are warranted, SpaceX will prepare a data recovery plan and submit it to the FAA, Texas SHPO, and any affected Native American tribe for review. The data recovery plan will be completed within 14 days of the determination that additional investigation is warranted. Upon approval of the plan, SpaceX will arrange for a professional archaeological excavation crew to be on the site as soon as practicably possible.

The need for additional investigation can be decided upon during, and implemented directly after, the initial coordination meeting.

If data needs are related to establishing the origin and context of the human remains, the removal of the human remains may be part of the additional data recovery efforts. In these instances, with the consensus of the FAA and Texas SHPO, SpaceX will be authorized to resume work in the area

Following the inclusion of the results of the additional investigation, a final treatment plan will be submitted to the FAA. It is anticipated that an additional coordination meeting will be held in order to facilitate final consensus on the treatment and disposition of the human remains. The discovery, treatment, and disposition determination of the FAA will be reported to all PA Signatories and Invited Signatories and any affected Native American tribe within 10 days of consensus.

Upon approval of the treatment plan, SpaceX will arrange for a professional archaeological excavation crew to be on the site as soon as practicably possible in order to implement the agreed upon treatment plan.

# Attachment A – Contact List

| Organization/Title | Contact Name | Telephone Numbers |
|---|---|---|
| SpaceX Project Manager | TBD | TBD |
| SpaceX FCR | TBD | TBD |
| SpaceX CRS | TBD | TBD |
| FAA Environmental Protection Specialist | TBD | TBD |
| Texas SHPO | TBD | TBD |
| Texas Department of Public Safety | TBD | TBD |
| South Texas Refuges Complex Office | TBD | (956) 784-7500 |
| Lower Rio Grande Valley National Wildlife Refuge | TBD | TBD |

## Attachment C. Launch Operations Closure Areas

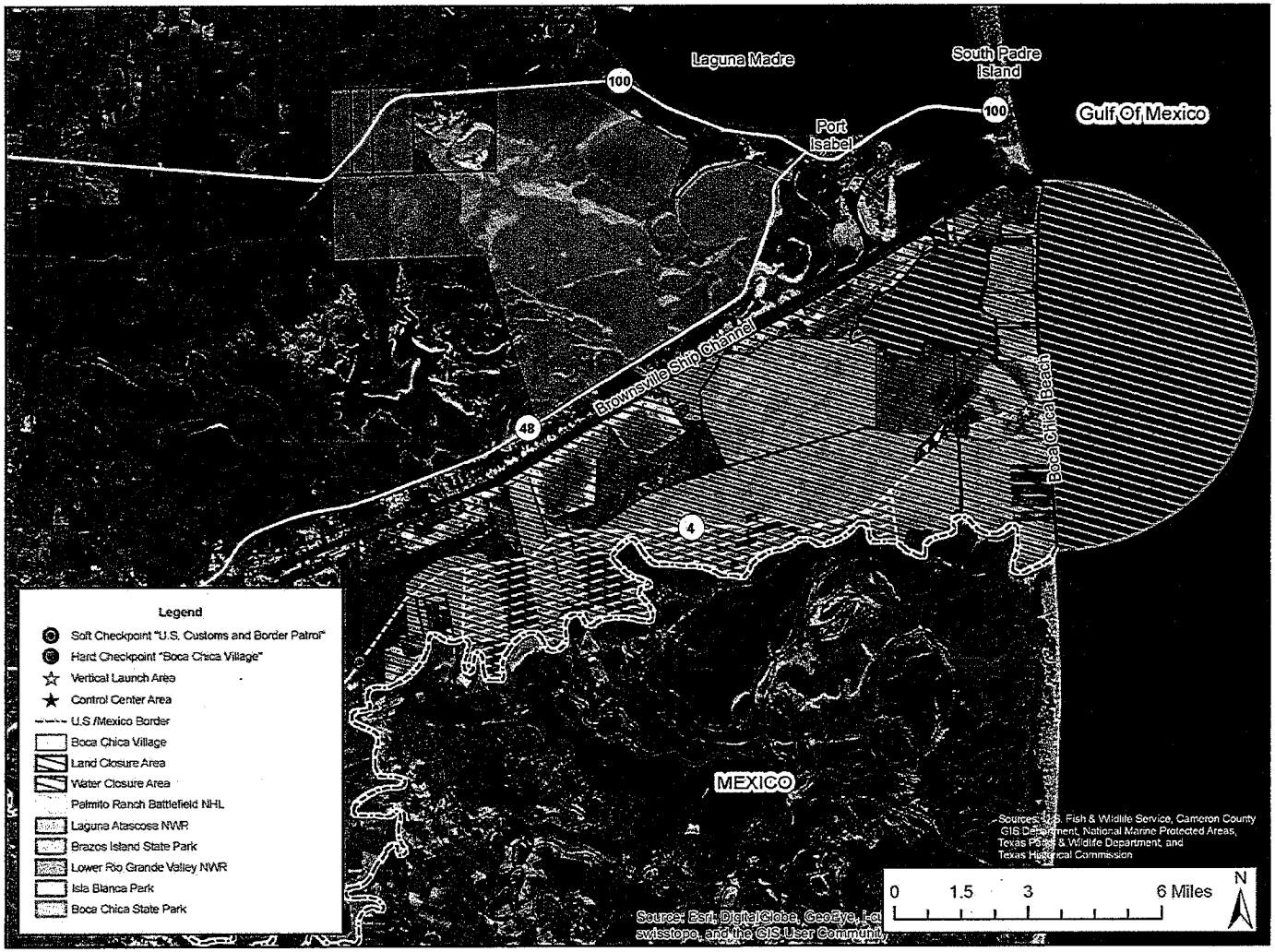


**Exhibit C-1. Launch Operations Closure Areas**