

Appendix C.  
**National Historic Preservation Act Section 106  
Consultation**

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**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,  
LOCATED AT BOCA CHICA, CAMERON COUNTY, TEXAS  
(AGREEMENT)**

**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 Starship/Super Heavy launch vehicles from SpaceX's Boca Chica Launch Site, which is located on privately owned property in Cameron County, Texas (the Project); and

**WHEREAS**, the Project involves an existing launch and landing control center (LLCC) and SpaceX proposes to construct additional launch-related infrastructure at the vertical launch area (VLA) on private property to launch vehicles from its Boca Chica Launch Site in Cameron County, Texas, as described in Attachment A and shown in Attachment A, Figures A-2, A-4, and A-5, with development limited to the property boundary shown in Figure A-4 and the solar expansion area shown in Figure A-5; and

**WHEREAS**, the FAA's jurisdiction over the Project entails the issuance or denial of launch licenses and/or experimental permits, other work planned by SpaceX (e.g., modifications to State Highway [SH] 4 or within the SH 4 right-of-way [ROW]) is not dependent on the Project, and SpaceX would coordinate these improvements with the Texas Department of Transportation (TxDOT), Cameron County, and United States Fish and Wildlife Service (USFWS), as needed; and

**WHEREAS**, Project launch operations would involve restricted access 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, Figure A-1, for the safety and security of the general public, not to exceed the number of annual hours stated in Attachment A and the number of annual operations shown in Attachment A, Table A-2; 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), 54 U.S.C. § 306108, and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 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 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 on historic properties as provided in 36 CFR §§ 800.4(a) and 800.16(d); and

**WHEREAS**, the FAA, in consultation with the SHPO, determined Areas of Potential Effects (APEs) for archaeological resources and architectural resources. The archeological APE encompasses the VLA, areas along SH 4 for utility installation and highway pull-offs, two solar farm expansion areas, a parcel referred to as the "Sanchez Lot" located near the LLCC (i.e., SpaceX's processing area shown in Attachment A, Figure A-5), an area for use as a parking lot, and an approximate 724-acre area near the VLA to account for potential launch anomalies. The APE for architectural resources, cultural landscape attributes of the Palmito Ranch Battlefield, and viewshed is defined by a 10-mile radius centered on the VLA (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 consulting parties, including the Texas SHPO, and identified seventeen (17) historic properties within the APEs; a complete listing of these historic properties is included within Attachment C of this Agreement; and

**WHEREAS**, the FAA has prepared the following reports in its evaluation of the potential effects of the proposed Project on historic properties: (1) *2014 Environmental Impact Statement, SpaceX Texas Launch Site*; (2) *2013 Final Archaeological Resources Investigation for the Proposed SpaceX Texas Launch Site, Cameron County, Texas*; (3) *2013 Final Architectural Survey for the Proposed SpaceX Texas Launch Site, Cameron County, Texas*; (4) *2021 Management Summary Phase I Cultural Resources Survey of the SpaceX Starship Super Heavy Launch Operations and Revised Impact Area*; (5) *2022 Phase I Cultural Resources Survey SpaceX Starship/Super Heavy Launch Operations at the SpaceX Boca Chica Launch Site in Cameron County, Texas*; and (6) *2022 Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas*, and these reports provide supporting information to this PA; and

**WHEREAS**, the 2020 remote-sensing cultural resources survey of the beach detected four magnetic anomalies (M001/PM001, M003, M026/PM002, and M088/PM003) and eight additional magnetic targets that may represent discontinuous sites and/or are associated with the shipwreck magnetic targets (M030/PM004, M031/PM005, M041/PM010, M057, M062/PM006, M106/PM007, M114/PM008, M123/PM009). There is the potential for adverse effects to the sources of the recorded magnetic anomalies if exposed by storms. As such, 12 magnetic anomalies (M001/PM001, M003, M026/PM002, M088/PM003, M030/PM004, M031/PM005, M041/PM010, M057, M062/PM006, M106/PM007, M114/PM008, and M123/PM009) will be treated as sensitive areas and avoided by the mandatory state-required 50-meter buffer as measured from their outer magnetic contours, within which no construction or ground-disturbing activities can occur. Additional investigation is required if the targets cannot be avoided; and

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

**WHEREAS**, the FAA, in consultation with the Signatories, determined the Undertaking will cause adverse effects to a National Historic Landmark (NHL), the ***Palmito Ranch Battlefield***, due to the visual effects of construction at the VLA and increased visitation and use of the area due to the presence of the launch site that could diminish the NHL's integrity of setting and feeling. Furthermore, 36 CFR § 800.10(c) requires that the Federal agency notify the Secretary of the Interior of any consultation that involves an NHL and invite the Secretary of the Interior to participate in the consultation where there may be an adverse effect to the NHL. 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 June 18, 2012, and has invited NPS to be a Signatory to this Agreement; and

**WHEREAS**, Section 110(f) of the NHPA (54 U.S.C. § 306107) specifies prior to the approval of any Federal undertaking that may directly and adversely affect any NHL, the head of the responsible Federal agency shall to the maximum extent possible undertake such planning and actions as may be necessary to minimize harm to the NHL; and

**WHEREAS**, the FAA has determined one of the affected properties is listed in the National Register, the ***Port Isabel Lighthouse*** (also known as, and listed in the National Register as, the Point Isabel Lighthouse), and may be adversely affected by the Undertaking due to visual effects from construction of the VLA, launch operations, and auditory effects (including ground vibrations); and

**WHEREAS**, the FAA, in consultation with the Signatories, determined the following properties are eligible for listing in the National Register and found the Undertaking will cause adverse effects due to auditory impacts (including ground vibration) from launch events, visual effects from the presence of the infrastructure and launch events, effects from increased visitation and use of the area, and/or effects from potential launch anomalies:

- Old Point Isabel Lighthouse 1936 Centennial Historic Marker (Texas Historical Marker [THM] no. 3780)
- Palmetto Pilings 1936 Centennial Marker (THM no. 3917)
- Palmetto and Cypress Bridge Pilings (41CF117)
- Queen Isabella Memorial Causeway (BC-AH1, SH 100 over the Laguna Madre)
- Long Island Swing Bridge (BC-AH2, South Garcia Street over the Gulf Intracoastal Waterway)
- Queen Isabel Inn
- Alta Vista Apartments (Recorded Texas Historic Landmark in 1988)
- Charles Champion Building
- Port Isabel Cemetery

## Section 106 PA for SpaceX Boca Chica Launch Site

- Point Isabel Coast Guard Building
- Port Isabel Firemen's Hall
- Former Bahia Mar and Bahia Grande Condominiums
- Former Sea Island Resort Hotel
- Former Ship Café Building
- White Sands Motel; and

**WHEREAS**, pursuant to this PA, SpaceX has prepared launch site plans as outlined in Attachment D, in order to provide information for FAA to consider as part of the National Environmental Policy Act (NEPA) and Section 106 processes and for issuance of licenses and/or experimental permits; 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 in the following ways: FAA's publication of the Notice of Intent in the *Federal Register* on April 10, 2012 (77 FR 21619); through a public scoping meeting on May 15, 2012 and a public hearing on May 7, 2013 as part of the NEPA process; through a sixty (60) day review and comment period for the *Draft Environmental Impact Statement, SpaceX Texas Launch Site*; through public circulation on September 17, 2021 of the *Draft Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas* (2021 Draft PEA); public hearings on the Draft PEA on October 18, 2021 and October 20, 2021; and a forty-five (45) day review and comment period on the Draft PEA; 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 avoiding or minimizing effects to these sites; and

**WHEREAS**, after reviewing these comments, the FAA invited the Carrizo/Comecrudo Nation of Texas, a non-Federally Recognized Tribe, to participate in consultation as an interested party; and

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

**WHEREAS**, the Palmito Ranch Battlefield NHL is located within land owned by the U.S. Fish and Wildlife Service (USFWS); therefore, USFWS 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 the consultation process by letter dated May 10, 2013, and USFWS is an Invited Signatory to this Agreement; and

**WHEREAS**, the Palmetto Pilings 1936 Centennial Marker at the Palmetto and Cypress Bridge Pilings site (41CF117) is located within Boca Chica State Park; this State Park is 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 TPWD to participate in the consultation process by letter dated May 10, 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 June 14, 2012 and on September 30, 2021; and

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

**WHEREAS**, a Programmatic Agreement (the “2014 Falcon Program PA”) for an earlier undertaking (the FAA’s issuance of launch licenses and/or experimental permits to SpaceX for SpaceX launches of its Falcon launch vehicles) at the Boca Chica Launch Site was executed by the FAA, Texas SHPO, NPS, ACHP (with SpaceX, USFWS, and TPWD as Invited Signatories) on May 22, 2014, but the revised undertaking resulted in such substantial and extensive changes to the preamble, Stipulation VI, Stipulation XI, and attachments of the 2014 Falcon Program PA that the FAA consulted with the ACHP and decided to issue this new Agreement for the Undertaking instead of amending the previous agreement; and

**WHEREAS**, this PA supersedes and replaces the 2014 Falcon Program PA; and

**WHEREAS**, a Memorandum of Agreement (MOA) for the earlier Falcon Program Undertaking at the Boca Chica Launch Site was executed by the FAA, the Texas SHPO, the NPS, ACHP (with SpaceX, USFWS, and TPWD as Invited Signatories) on January 5, 2015. This PA supersedes and replaces the 2015 MOA; and

**WHEREAS**, the FAA, in consultation with the Signatories and Consulting Parties, has consulted with SpaceX about the resolution of adverse effects and has invited SpaceX to sign this PA as an invited signatory because of its obligation to implement the avoidance, minimization, and mitigation measures stipulated in this PA; and

**WHEREAS**, the FAA has involved the public, adjacent property owners, and other interested parties early in the Federal decision-making process through the agency’s existing procedures and through the NEPA process, which included additional public notice, public meetings, and

opportunities to comment on the 2021 Draft PEA; and through dissemination of information on the Project and its potential effects on historic properties that included opportunities to comment on identification and evaluation of properties as well as resolution of adverse effects on historic properties; the FAA has determined this to be consistent with 36 CFR § 800.2(d); 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 for and resolve 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 (54 U.S.C. § 306108), Texas Health and Safety Code Chapter 711, and Texas Administrative Code Title 13, Part 2, Chapter 26 and Chapter 28 as well as 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) (36 CFR 68);
  - 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. Council of Texas Archaeologists: *Archeological Survey Standards for Texas* and Council of Texas Archeologists: *Guidelines for Cultural Resource Management Reports*.

**II. RESOLUTION OF ADVERSE EFFECTS BY INDIVIDUAL PROPERTY LISTED IN ATTACHMENT C**

- a. Adverse effects (i.e., visual effects, auditory/vibration effects, visitation effects, and/or effects from launch anomalies) to the specific properties listed in or eligible for listing in the National Register are identified in Attachment C.
- b. Adverse effects will be resolved through the specific measure(s) included in Stipulations III and IV that are identified for each type of effect (see Attachment C).

**III. AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES FOR EFFECTS ASSOCIATED WITH CONSTRUCTION AND DAILY OPERATIONS ON HISTORIC PROPERTIES IDENTIFIED IN THE APES**

- a. Visual effects to the Palmito Ranch Battlefield NHL, Port Isabel Cemetery, Queen Isabel Inn, Alta Vista Apartments, Port Isabel Lighthouse, Palmetto Pilings 1936 Centennial Marker, Charles Champion Building, Point Isabel Coast Guard Building, Former Bahia Mar and Bahia Grande Condominiums, Former Sea Island Resort Hotel, Former Ship Café Building, and White Sands Motel would be resolved through the following:
  - i. Underground Utility Line Installation. SpaceX will install all utility lines between the LLCC and VLA underground to avoid visual effects to the Palmito Ranch Battlefield NHL.
    - a) The underground installation of utility lines will occur entirely within previously disturbed SH 4 right-of-way. No archaeological resources were identified in the right-of-way corridor during a 1999 survey. SpaceX will coordinate underground utility installation with TxDOT and USFWS, as applicable, and use the Unanticipated Discoveries Plan (see Attachment D) in the event of an inadvertent discovery of archaeological resources.
  - ii. Historical Context Report. SpaceX will hire a consultant with relevant professional qualifications as described in PA Stipulation I.a 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 APES. 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 approve the draft scope of work for this report.

- a) The FAA, Texas SHPO, TPWD, 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, TPWD, and NPS for their review and comment. The FAA, Texas SHPO, TPWD, 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, TPWD, and NPS for a thirty (30) calendar day review period. SpaceX will take all comments into consideration and submit a final report. SpaceX may proceed with submitting the final report to the FAA, Texas SHPO, TPWD, and NPS if the agencies 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 year of execution of this PA.
- iii. Interpretive Signage. SpaceX will fund the development and production of five (5) interpretive signs (in English and Spanish) that describe the history and significance of the historic properties in the APEs, including the Pilings Camp Site. These signs will educate visitors and the general public on the importance of cultural resources, the need to stay within defined access areas, and the legal implications of vandalism and artifact collecting. A qualified historian will develop the content of the signs and may include information obtained in Stipulation III.a.ii. NPS and USFWS will collaborate on the design and materials of the signs to be consistent with their existing signage.
  - a) NPS will prepare the scope of work for the design and content of interpretive signage, a list of qualified contractors, and the basic materials and provide to SpaceX within 12 months of the date of this PA.
  - b) SpaceX will provide the preliminary plans for the design and content of the signs to the Texas SHPO, NPS, TPWD, and USFWS for review and comment within 60 days of receipt of Stipulation III.a.iii.a). 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.

- c) SpaceX will have the signs produced by a qualified contractor identified by NPS within one (1) year from the receipt of the scope of work from NPS.
  - d) The locations for installing the interpretive signs will be determined in consultation with the Texas SHPO, NPS, TPWD, and USFWS within 12 months of the date of this PA.
  - e) Within thirty (30) calendar days of installation, SpaceX will submit photo-documentation of the interpretive signs to the FAA. FAA will distribute the documentation to Texas SHPO, NPS, TPWD, and USFWS as evidence of fulfillment of this measure. Digital photographs submitted via e-mail is acceptable.
- iv. Educational Outreach. SpaceX will fund educational outreach (e.g., webpage content for agency websites, informative videos) to the public about the region's cultural heritage. The educational outreach material will be subject to the review process described in Stipulation V.
- v. Historic American Landscapes Survey: The FAA shall ensure that SpaceX's documentation of the landscape of the Palmito Ranch Battlefield is completed. Given the size, scale, complexity, and nature of this historic property, the consulting parties would consult to determine a reasonable and appropriate scope of work as outlined below, including but not limited to, the portions of the Battlefield within the existing National Historic Landmark boundary and publicly accessible areas along SH 4, with a concentration on Palmito Ranch Battlefield's core area. The documentation package will be in accordance with the Secretary of the Interior's *Guidelines for Architectural and Engineering Documentation, specifically the Historic American Landscapes Survey (HALS) Guidelines*.
  - a) This documentation shall follow the Level I HALS standards and guidelines for nationally significant properties and shall include comprehensive completion of the HALS historic report form, photographs, and drawings.
    - i. The Historic Report Form shall follow the outline provided in the *Guidelines for Historical Research and Reports*, including the historical information, physical information, sources of information, and project information.
    - ii. The photographs shall consist of large-format, black and white negatives and photographs as described in the *HABS/HAER/HALS Photography Guidelines*. Photographs shall generally include contextual views of the landscape, general landscape views, any historic structures or structural elements, and views capturing the spatial relationships of the

landscape. Given the delicate ecology of the Palmito Ranch Battlefield, the NPS will provide direction for large-format photography before fieldwork commences.

- iii. The drawings shall follow the *Guidelines for Drawings* and shall depict the existing conditions and relevant features of the landscape. Given the scale and nature of the battlefield, this consultation may include the following:
    - a. Drawings will be created using existing USGS topographic maps and other relevant existing data.
    - b. Drawings will be produced using existing information and will provide an overview of the Battlefield within the existing National Historic Landmark boundary but will concentrate on the Palmito Ranch Battlefield's core area.
  - iv. Select existing photographs, drawings, maps, or other resources may be included as supplemental material in the HALS documentation as appropriate and in accordance with the U.S. Copyright Act (as amended). Digital color reference photographs that are taken in during the HALS large format fieldwork will be included with the supplemental material.
- b) Within nine (9) months of the execution of this PA, FAA shall submit a Draft HALS Scope of Work. The consulting parties shall have thirty (30) calendar days from the date of receipt to provide comments on the HALS Scope of Work. FAA shall take all comments into consideration when revising the HALS Scope of Work. Within three (3) months of the conclusion of this review period, FAA shall submit a Final HALS Scope of Work to the consulting parties. The Final HALS Scope of Work must be approved and accepted by the FAA, Texas SHPO, and NPS.
- i. The HALS Scope of Work shall identify the character defining features, spatial organization, and views of the Palmito Ranch Battlefield landscape to be recorded in the HALS historic report form, photographs, and drawings. The HALS Scope of Work shall also identify the number of sheets to be produced and details on the drawing formats.
- c) Within two (2) years of the acceptance of the Final HALS Scope of Work, FAA shall submit the Draft HALS Level I documentation to the consulting parties for review. The consulting parties shall have thirty (30) calendar days from the date of receipt to provide comments on the Draft HALS Level I documentation. FAA shall take all comments into

consideration when revising the HALS Level I documentation. Within three (3) months of the conclusion of this review period, FAA shall submit the Revised HALS Level I documentation to the consulting parties for review. The FAA, Texas SHPO, and NPS Heritage Documentation Program must approve and accept the Revised HALS Level I documentation prior to producing the Final Archival HALS Level I documentation.

- i. Scanned/digital copies of the Draft and Revised HALS Level I documentation may be transmitted to the consulting parties for review.
  - d) All Final Archival HALS Level I documentation shall meet the archival standards set forth in the Secretary of the Interior's *Guidelines for Architectural and Engineering Documentation* and the *HALS Guidelines*.
  - e) Upon acceptance by the FAA, Texas SHPO, and NPS Heritage Documentation Program, the FAA shall transmit the Final Archival HALS Level I documentation to the Library of Congress as described in *Preparing HABS/HAER/HALS Documentation For Transmittal*. If the Final Archival HALS Level I documentation is accepted by the Library of Congress, FAA shall inform the consulting parties of the acceptance and provide the final Site Name and HALS Number used.
    - i. Copies of the HALS Level I documentation shall be offered to the Texas SHPO, NPS Heritage Documentation Program, and NPS Palo Alto Battlefield National Historical Park. These recipients may choose to accept scanned/digital copies, non-archival hardcopies, or archival hardcopies (excluding the original photograph negatives) of the HALS Level I documentation. Scanned/digital copies of the HALS Level I documentation shall be offered to the remaining consulting parties.
  - f) This stipulation shall be considered complete upon the approval and acceptance of the HALS Level I documentation by the FAA, Texas SHPO, and NPS Heritage Documentation Program, and the transmittal of the Final Archival HALS Level I Documentation to the Library of Congress.
- b. Auditory and vibration effects to the Palmetto and Cypress Bridge Pilings, Palmetto Pilings 1936 Centennial Marker, Port Isabel Cemetery, Queen Isabella Memorial Causeway, Long Island Swing Bridge, Queen Isabel Inn, Alta Vista Apartments, Port Isabel Lighthouse, Old Point Isabel Lighthouse 1936 Centennial Marker, Charles Champion Building, Point Isabel Coast Guard Building, Former Bahia Mar and Bahia

Grande Condominiums, Former Sea Island Resort Hotel, Former Ship Café Building, and White Sands Motel would be resolved through the following:

- i. Noise Reduction of Construction Equipment. SpaceX will implement the following measures to reduce noise levels generated by construction equipment:
  - a) SpaceX will use baffle boxes, attached mufflers, or other functioning noise-abatement methods in accordance with industry standards for construction generators.
  - b) SpaceX will use quieter equipment or methods, such as choosing equipment with only the necessary size and power, as appropriate unless the quieter options diminish the safety, security, or quality of construction on the site.
  - c) When available, SpaceX will use an observer to direct vehicle backups. At all other times, SpaceX will use quieter equipment backup alarms (manually adjustable or broadband), when practicable.
- ii. Minimization of Truck Traffic Noise. SpaceX will implement the following measures to minimize noise from truck (construction, tanker, concrete, water, and delivery) traffic:
  - a) SpaceX will schedule the majority of truck operations between 8:00 a.m. and 5:00 p.m., Monday through Friday.
  - b) SpaceX will ensure all trucks use 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.
- iii. Pre-Launch Vibration Monitoring. The purpose of the monitoring program is to continue to gather data on the effects on certain historic resources from vibration due to launch operations and address any structural damage appropriately. Prior to the first Starship/Super Heavy launch, SpaceX has hired a qualified professional who performed a pre-launch condition assessment and with an appropriately qualified engineer with experience in vibro-acoustic measurement who took baseline vibration levels at the Palmetto Pilings 1936 Centennial Marker, Palmetto and Cypress Bridge Pilings site, and the Port Isabel Lighthouse. The results of the pre-launch condition assessment were used to develop a Vibration Monitoring Plan prior to the first launch event. If the pre-launch condition assessment finds that resources are unlikely to withstand any elevated levels of vibration, they 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 PA Stipulation V of the PA.

- iv. Launch Vibration Monitoring. For the first five (5) Starship/Super Heavy launches, vibration levels will be monitored at the Palmetto Pilings 1936 Centennial Marker, Palmetto and Cypress Bridge Pilings site, the Port Isabel Lighthouse, and at locations two (2) miles, three (3) miles, and eight (8) miles from the launch site, as described in the Vibration Monitoring Plan, in order to determine whether historic resources located further from the launch site could potentially be affected. This monitoring would determine whether dynamic events have caused any small incremental damage prior to noticeable damage. If the assessment determines that resources may be unlikely to withstand any elevated levels of vibration, SpaceX will hire a qualified professional to make recommendations for the stabilization and protection of the resource. If permanent stabilization is 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 V of the PA.
  - a) The Vibration Monitoring Plan will be subject to the review process described in PA Stipulation V. SpaceX will hire one or more qualified engineers to take vibro-acoustic measurements during each of the first five (5) Starship/Super Heavy launch events. A qualified professional will assess the condition of the Palmetto Pilings 1936 Centennial Marker, the Palmetto and Cypress Bridge Pilings site, and the Port Isabel Lighthouse within a day after each Starship/Super Heavy launch.
  - b) SpaceX will develop a report to document the findings of the vibro-acoustic monitoring and condition assessment within 30 days after each of the first five (5) Starship/Super Heavy launches. Each report will be subject to the review process as described in PA Stipulation V. SpaceX shall submit the report on one launch for review before FAA permits the next launch to proceed.
- c. Visitation Effects to the Palmito Ranch Battlefield NHL, Palmetto and Cypress Bridge Pilings, Palmetto Pilings 1936 Centennial Marker, and Port Isabel Lighthouse would be resolved through the following:
  - i. One-Time Replication of Missing Marker Elements. SpaceX will pay for the replication and installation of the missing star and wreath on the Palmetto Pilings 1936 Centennial Marker. SpaceX accomplished this measured in 2015 as part of compliance with the 2015 MOA; however, the star and wreath were removed after SpaceX replaced them. SpaceX will replace the star and wreath again within 1 year following completion of construction. However, should the Palmetto Pilings Marker be damaged by SpaceX's activities, such as from an anomaly, SpaceX will repair the Marker, as described in Stipulation III.d.i., below. Within thirty (30) calendar days of the installation of the star and wreath, SpaceX will submit photo-documentation of the Marker to the FAA and Texas

SHPO as evidence of the completion of this measure. Digital photographs submitted via email is acceptable.

- ii. Soft Checkpoint Location. SpaceX will maintain the soft checkpoint access restriction area during launch operations 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.
  - iii. Construction Protection. SpaceX will place temporary construction barriers around the Palmetto Pilings 1936 Centennial Marker before construction activities within the vicinity of the Marker begin to protect the Marker from inadvertent damage from construction vehicles. SpaceX will remove the barriers after construction is complete.
- d. Effects from Launch Anomalies to the Palmetto and Cypress Bridge Pilings and the Palmetto Pilings 1936 Centennial Marker would be resolved through the following:
- i. Post Anomaly Restoration. In the event of an anomaly affecting a historic property, SpaceX will hire a qualified professional to make recommendations for restoration of the historic property unless other mitigation is proposed by consulting parties. This includes, but is not limited to, one piling previously damaged by SpaceX anomaly debris (the SN11 anomaly). All work will be done following the Secretary of the Interior's Standards for the Treatment of Historic Properties. The proposed restoration will be subject to the review process described in Stipulation V. Upon review and approval, SpaceX will hire a qualified professional to restore the historic property.

#### **IV. 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 Stipulations VI and VII.
- b. The FAA will include in the Unanticipated Discoveries Plan described in Stipulation VIII the protocols for notifying and consulting with tribes in the event of a discovery of human remains and/or funerary objects.

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

- a. Development, update, review, and approval of any draft plan or report associated with this Undertaking, including SpaceX's various launch site plans (listed in Attachment D), Vibration Monitoring Plan, and the Unanticipated Discoveries Plan (described in Stipulation VIII) 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 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 revised plans if the plans submitted do not fully 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 thirty (30) 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 PA Stipulation XII.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 fifteen (15) business day review and written concurrence. If no written concurrence is received from the Signatories or Invited Signatories by the end of the 15-day review period, the FAA and SpaceX will proceed with 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 the 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.
- b. If Signatories or Invited Signatories review any draft plan or report associated with this Undertaking and comment that effects would occur outside the APEs described in the third WHEREAS clause on page 2 and illustrated in Attachment B, FAA shall



review the proposed draft plan or report to determine if the APEs should be expanded.

- i. If the FAA determines, in consultation with Texas SHPO, that additional work is necessary to identify and evaluate historic properties, the procedures for identification will follow those described in 36 CFR 800.4, including consultation with Signatories and Invited Signatories.
- ii. The FAA shall evaluate the National Register eligibility of any identified property and seek the concurrence of the Texas SHPO.
- iii. If historic properties in the expanded APE are identified, assessment of effects will follow the procedures in Stipulations II and III, and the historic property will be added to Attachment C.

## **VI. ASSESSMENT OF EFFECTS**

- a. To the extent that assessment of effects requires further evaluation, the FAA will assess the effects on historic properties in the APE<sup>1</sup> 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 determination 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

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<sup>1</sup> The APE may change in the event of an anomaly with a debris field larger than, or outside of, the archeological APE shown on Figure B-1. If the APE is modified, SpaceX will update the Unanticipated Discoveries Plan accordingly.

any objection to an effects determination. If the FAA cannot resolve the objection, the FAA will follow the procedures under Stipulation XII.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 thirty (30) business day review and written concurrence. If no written concurrence is received from the Signatories or Invited Signatories by the end of the 30-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 30-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 XII.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 VII.

## **VII. RESOLUTION OF ADVERSE EFFECTS**

- a. Any new 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).

## **VIII. POST-REVIEW DISCOVERIES**

- a. SpaceX developed an Unanticipated Discoveries Plan prior to the start of initial construction activities under the 2014 EIS. The plan was reviewed and accepted by the Signatories and Invited Signatories in 2014. The plan specifies 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. SpaceX will update the plan to account for the new

Starship/Super Heavy undertaking. The revised Unanticipated Discoveries Plan will be developed in consultation as described under Stipulation V.

## **IX. 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 XIII.

## **X. 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 XIII to make such revisions.

## **XI. MONITORING AND REPORTING**

- a. Each year following the execution of this Agreement, SpaceX will develop 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 describing activities as they relate to compliance with the stipulations of this Agreement. The annual report will include the following:
    - a) A description of the past year's efforts and anticipated upcoming efforts for identification, evaluation, mitigation, and protection of historic properties.
    - b) An accounting of all annual access restrictions for FAA-licensed activity.
    - c) An accounting of traffic and heavy transport counts for FAA-licensed activity on SH4.
    - d) An evaluation of the progress of mitigation activities.

- e) A description of any known or expected changes to the Undertaking, including detailed annual construction report and any available information regarding upcoming changes to site infrastructure or development.
- 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 at least one week prior to the Annual Meeting.
  - ii. The meeting will be conducted virtually or 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.

## **XII. DISPUTE RESOLUTION**

- a. If 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 considers 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 considered 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.

### **XIII. 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 the date of execution of this Agreement, 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 XIII.b. If an amendment cannot be reached within thirty (30) calendar days (or another time period agreed to by all Signatories), 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 XIII.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, consider, 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 considered the effects of the Undertaking on historic properties.

**SIGNATORIES**

**FEDERAL AVIATION ADMINISTRATION**

By: MICHELLE S MURRAY Digitally signed by MICHELLE S MURRAY  
Date: 2022.04.22 10:11:40 -04'00'

Michelle S. Murray  
Manager, Safety Authorization Division  
Office of Commercial Space Transportation

4/22/22  
Date: \_\_\_\_\_

**TEXAS STATE HISTORIC PRESERVATION OFFICER**

By: Mark Wolfe

Mark Wolfe  
Texas State Historic Preservation Officer

Date: 4/26/22

**NATIONAL PARK SERVICE**

By: **MICHAEL REYNOLDS**  Digitally signed by MICHAEL REYNOLDS  
Date: 2022.04.26 16:51:17 -06'00'

Michael Reynolds  
Regional Director, National Park Service serving Interior Regions 6,7,8

Date: \_\_\_\_\_



**ADVISORY COUNCIL ON HISTORIC PRESERVATION**

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

Reid Nelson  
Executive Director, Acting

Date: May 3, 2022

**INVITED SIGNATORIES**

**SPACE EXPLORATION TECHNOLOGIES CORP.**

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

Matt Thompson  
Senior Director, Environmental Health and Safety

Date: 04/28/2022\_\_\_\_\_

**UNITED STATES FISH AND WILDLIFE SERVICE**

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

Joseph R. Barnett  
Deputy Refuge Manager, Lower Rio Grande Valley NWR

Date: 6/07/2022\_\_\_\_\_

Section 106 PA for SpaceX Boca Chica Launch Site

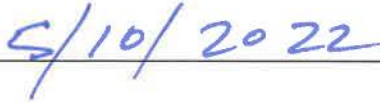
**TEXAS PARKS AND WILDLIFE DEPARTMENT**

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



Clayton Wolf  
Chief Operating Officer

Date: \_\_\_\_\_



## **ATTACHMENT A. PROJECT DESCRIPTION**

The Federal Aviation Administration (FAA) is evaluating SpaceX Exploration Technologies Corporation's (SpaceX) Starship/Super Heavy program, in particular a proposal to operate the Starship/Super Heavy launch vehicle at SpaceX's existing Boca Chica Launch Site in Cameron County, Texas (Figure A-1) and conduct launches originating from this site. SpaceX must obtain an experimental permit and/or a vehicle operator license from the FAA to operate the Starship/Super Heavy launch vehicle. The FAA's license determination is considered an undertaking under Section 106 of the National Historic Preservation Act (36 CFR 800.16(y)).

The Boca Chica Launch Site is located on SpaceX-owned land in Cameron County, Texas, near the cities of Brownsville and South Padre Island. The launch site consists of the vertical launch area (VLA), which is controlled by the launch and landing control center (LLCC). The VLA is approximately 2.2 miles north of the U.S./Mexico border and the LLCC is approximately 1.3 miles north of the U.S./Mexico border (Figure A-2).

The Boca Chica Launch Site is surrounded by several private and public industries, including SpaceX processing, production, and manufacturing facilities, the Port of Brownsville, proposed LNG facilities, the City of Port Isabel, San Roman Wind Farm, and South Padre Island. Boca Chica Village now includes support infrastructure, such as housing, restaurants, and offices for SpaceX facilities. Infrastructure from these industrial and residential areas, including large high rises on South Padre Island, tall container cranes and industrial infrastructure at the Port, and wind turbines at the wind farm, are visible from SH 4 and the Boca Chica Launch Site. Recreation in the area includes off-road vehicle use on Boca Chica Beach and surrounding areas.

SpaceX plans to execute its Starship/Super Heavy program over the next several years. SpaceX may require a number of new or modified experimental permits or vehicle operator licenses issued from the FAA in order to execute the program. The FAA is not licensing the entire Starship/Super Heavy program because SpaceX does not have the full details of all its planned operations at this time. The applicant, however, has provided the FAA with an initial mission profile that has been analyzed in the *Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas* (PEA) and this Section 106 consultation. The FAA's undertaking is to issue an experimental permit(s) and/or a vehicle operator license to SpaceX for this initial mission profile. As SpaceX plans future activities as part of its Starship/Super Heavy program, the FAA would analyze the environmental impacts of these future activities in a tiered environmental document.

**Figure A-1. Project Location**



**Figure A-2. Location of the Vertical Launch Area and Launch and Landing Control Center**



The Starship/Super Heavy program includes tank tests, pre-flight operations, suborbital launches, and orbital launches. SpaceX is still in the testing stages of the launch vehicle, including ongoing Starship prototype tests that have been approved under a separate license<sup>2</sup>. SpaceX also will need to conduct similar tests of Super Heavy prototypes, which has not yet been approved under a separate license. In the early stages of the Starship/Super Heavy program, SpaceX would still conduct tests (tank tests, static fire engine tests, and suborbital launches).

SpaceX's proposal also includes expansion of the VLA and solar farm, and construction of additional infrastructure. Finally, SpaceX's proposal includes two potential landing sites for the first Starship/Super Heavy mission—in the Gulf of Mexico and off the Hawaiian coast. All elements of the Proposed Action and SpaceX's proposal are identified in Table A-1.

<sup>2</sup> See: [https://www.faa.gov/data\\_research/commercial\\_space\\_data/licenses/](https://www.faa.gov/data_research/commercial_space_data/licenses/).

**Table A-1. Elements of the Proposed Action**

FAA Proposed Action	Elements of SpaceX's Proposal	Brief Description
Issuance of an Experimental Permit or Vehicle Operator License	Test and Launch Operations	<ul style="list-style-type: none"> <li>• Starship Static Fire Engine Tests</li> <li>• Super Heavy Static Fire Engine Tests</li> <li>• Starship Suborbital Launch</li> <li>• Super Heavy Launch</li> <li>• Starship Landing at the VLA, on a floating platform in the Gulf of Mexico or the Pacific Ocean, or expended in the Gulf of Mexico or Pacific Ocean</li> <li>• Super Heavy Landing at the VLA, on a floating platform in the Gulf of Mexico, or expended in the Gulf of Mexico</li> </ul>
	Tank Tests	<ul style="list-style-type: none"> <li>• Test the structural capability of the launch vehicle stages</li> </ul>
	Nominal Operational Access Restrictions	<ul style="list-style-type: none"> <li>• SpaceX anticipates the proposed operations would require 500 hours of annual access restriction</li> </ul>
	Anomaly Response Access Restrictions	<ul style="list-style-type: none"> <li>• If an anomaly occurred, SpaceX anticipates debris cleanup would require up to 300 hours of annual access restriction</li> </ul>
	Related Infrastructure Construction	<ul style="list-style-type: none"> <li>• Redundant Launch Pad (Launch Pad B) and Commodities (approximately 15 vertical tanks)</li> <li>• Redundant Landing Pad</li> <li>• Integration Towers</li> <li>• Tank Structural Test Stands</li> <li>• Support Buildings and Parking Lots</li> <li>• Trenching</li> <li>• Payload Processing Facility</li> <li>• Expanded Solar Farm</li> <li>• State Highway 4 Pull-offs</li> </ul>

TPWD = Texas Parks and Wildlife Department; TGLO = Texas General Land Office; USFWS = U.S. Fish and Wildlife Service



The fully integrated launch vehicle is comprised of two stages: Super Heavy is the first stage (or booster), and Starship is the second stage. The fully integrated Starship/Super Heavy launch vehicle is expected to be approximately 400 feet tall and 30 feet in diameter.

Operations include tank tests, pre-flight operations, suborbital launches, and orbital launches. SpaceX is still in the testing stages of the launch vehicle, including ongoing Starship prototype tests that have been approved under a separate license. SpaceX also will need to conduct similar tests of Super Heavy prototypes, which has not yet been approved under a separate license. In the early stages of the Starship/Super Heavy program, SpaceX would still conduct tests (tank tests, static fire engine tests, and suborbital launches). As shown in Table A-2, SpaceX plans to shift to orbital launches.

**Table A-2. Proposed Annual Operations**

Operation	Time <sup>a</sup>	Operational Limit
Starship Static Fire Engine Test <sup>b</sup>	Day	150 seconds
Super Heavy Static Fire Engine Test <sup>b</sup>	Day	135 seconds
Starship Suborbital Launch	Day or Night	5
Super Heavy Launch <sup>c</sup>	Day or Night	5
Starship Landing <sup>d</sup>	Day or Night	10
Super Heavy Landing <sup>e</sup>	Day or Night	5

Notes:

<sup>a</sup> SpaceX is planning to conduct most launches (suborbital and orbital) between the hours of 7:00 a.m. and 7:00 p.m. However, there could be launch delays due to unforeseen issues with the launch vehicle, weather conditions, or certain missions that require launching at a specific time at night to achieve a particular orbital position. For conservative purposes, the environmental review is assuming 20 percent of annual operations involving engine ignition for suborbital launches and orbital launches would occur at night.

<sup>b</sup> A static fire engine test is defined by the FAA as a launch licensed event beginning at functional Autonomous Flight Termination System installation and integration of the Starship and Super Heavy at the pad.

<sup>c</sup> A Super Heavy launch could be orbital or suborbital and could occur by itself or with Starship attached as the second stage of the launch vehicle.

<sup>d</sup> A Starship land landing could occur at the VLA, on a floating platform in the Gulf of Mexico, or on a floating platform in the Pacific Ocean. Alternatively, SpaceX could expend Starship in the Gulf of Mexico or Pacific Ocean. Further environmental review of landing at sites not described in this document would be necessary if proposed in the future.

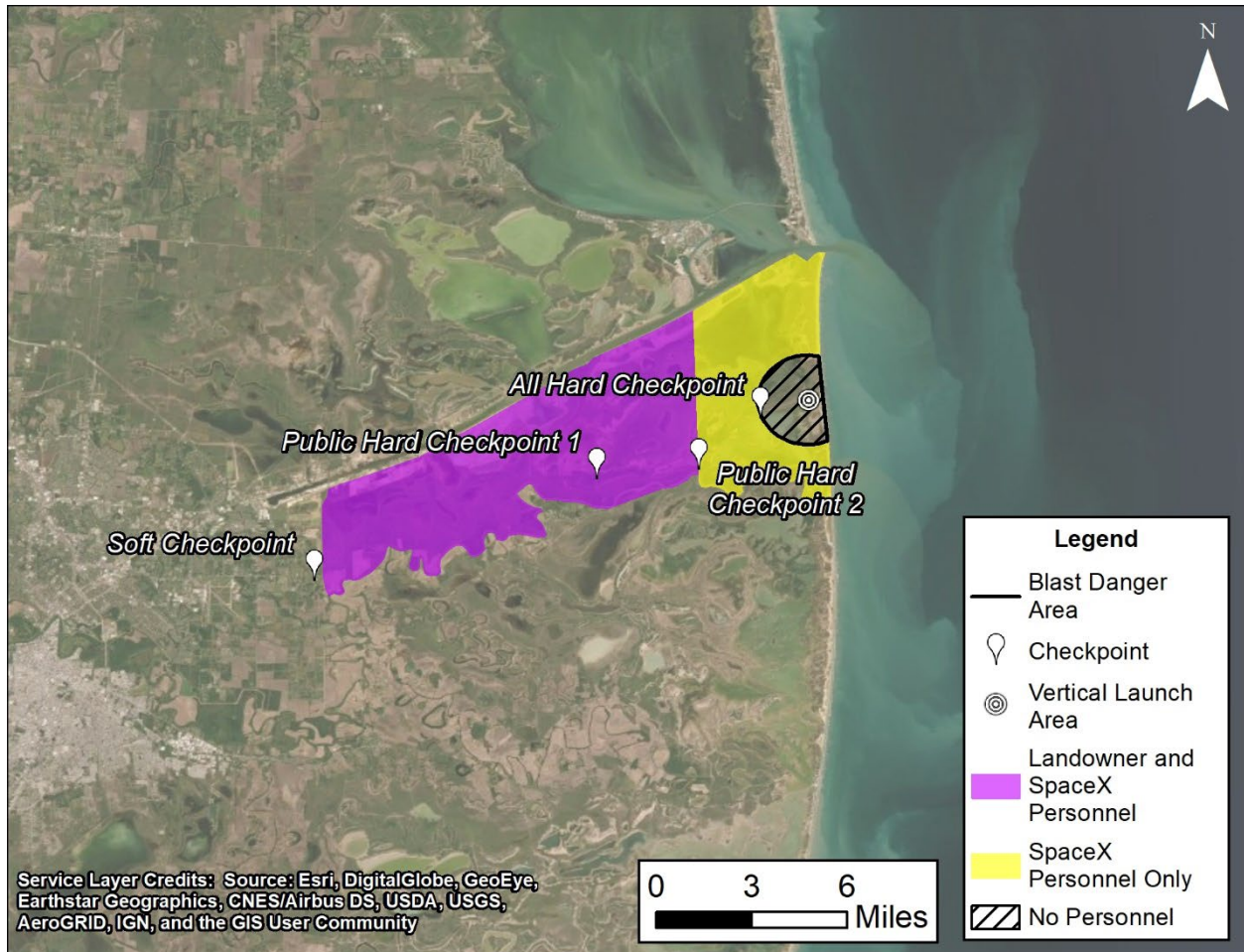
<sup>e</sup> A Super Heavy landing is part of a launch, as it would occur shortly after takeoff. Super Heavy could land at the VLA or on a floating platform in the Gulf of Mexico. Alternatively, SpaceX could expend Super Heavy in the Gulf of Mexico. Further environmental review of landing at sites not described in this document would be necessary if proposed in the future.

Tanks tests, wet dress rehearsals, static fire engine tests, and launches (suborbital and orbital) would require restricting public access in the vicinity of the VLA and securing land and water areas as part of public safety requirements. SpaceX refers to the areas on land that would be closed to public access as the *access restriction area* (Figure A-5). The access restriction area includes an area of Boca Chica Beach, ranging from the Brownsville Shipping Channel south to the U.S./Mexico border. The Brownsville Shipping Channel would be temporarily restricted during orbital launches and some suborbital launches, but not restricted during tank tests, wet dress rehearsals, or static fire engine tests.

The FAA defines an operational access restriction as follows:

An access restriction begins when local law enforcement, under the direction of an order from the Cameron County Commissioners Court, shuts down SH 4 and Boca Chica Beach to support the FAA-permitted or FAA-licensed activity, which may include a tank test, wet dress rehearsal, static fire engine test, or launch. An access restriction ends when the operation is completed, and local law enforcement opens SH 4 and Boca Chica Beach.

**Figure A-3. Access Restriction Area**



SpaceX is proposing additional launch-related construction, including expanding the solar farm near the LLCC, adding infrastructure and facilities at the VLA, parking lots, a payload processing facility, and trenching and pull-offs along SH 4. At the VLA, SpaceX is proposing to construct a redundant launch pad and commodities, a redundant landing pad, two integration towers, tank structural test stands, and additional support buildings. SpaceX is proposing to construct the payload processing facility on SpaceX property referred to as the manufacturing and production area (Figure A-5).

This new infrastructure and facilities would result in expansion of the VLA footprint to SpaceX's property boundary, excluding the dune buffer zone, which is 1,000 feet from the mean high tide

line. The VLA would be expanded to a total of approximately 40 acres. Figure A-4 shows the proposed VLA layout, including existing and proposed license-related infrastructure. Figure A-5 shows the overall layout of the SpaceX facilities, including the VLA, the LLCC, and other infrastructure within the scope of the FAA-licensed activities, as well as infrastructure related to non-licensed SpaceX activities in the private production and manufacturing area.



Figure A-4. Proposed Vertical Launch Area Layout

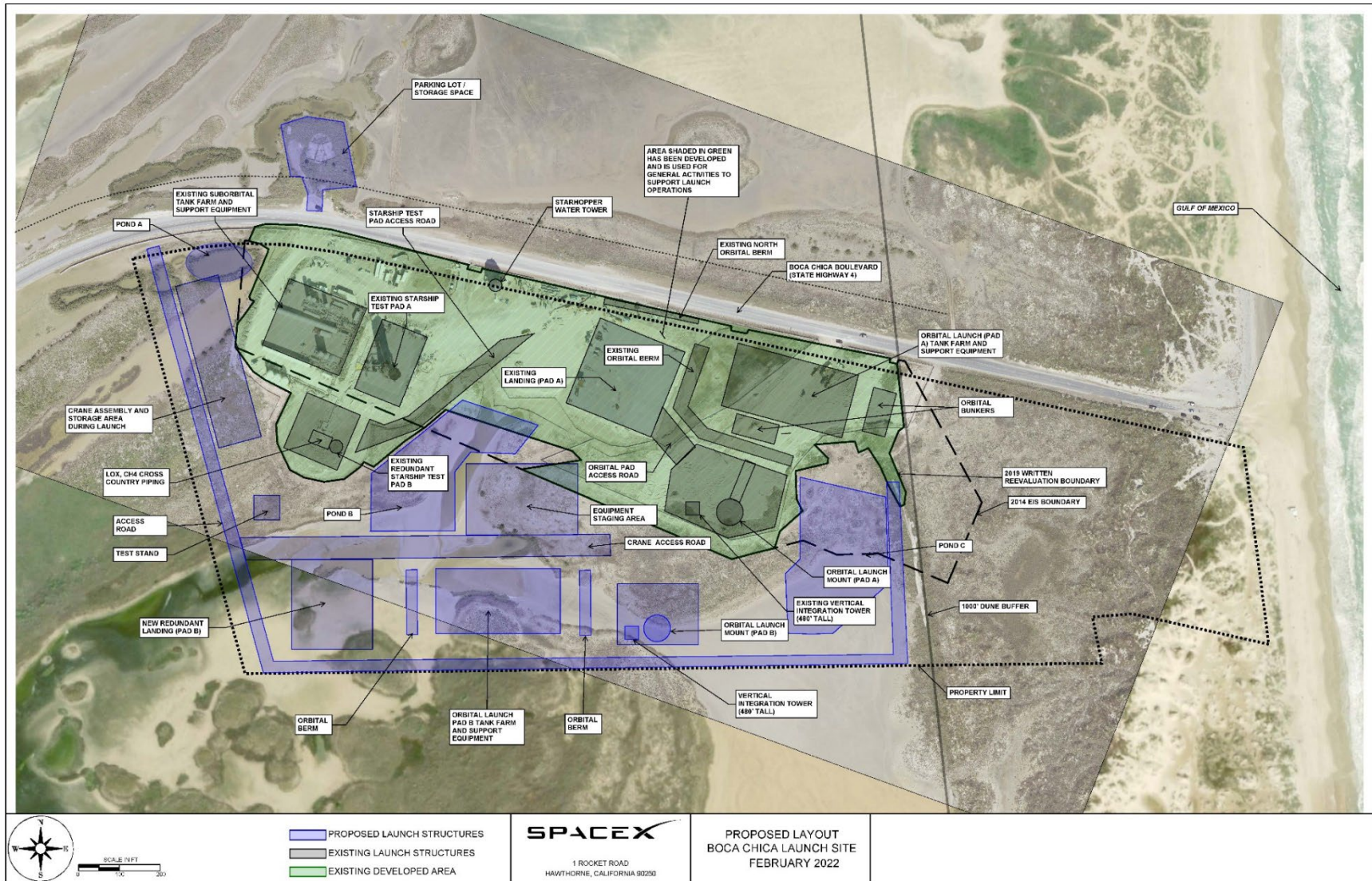
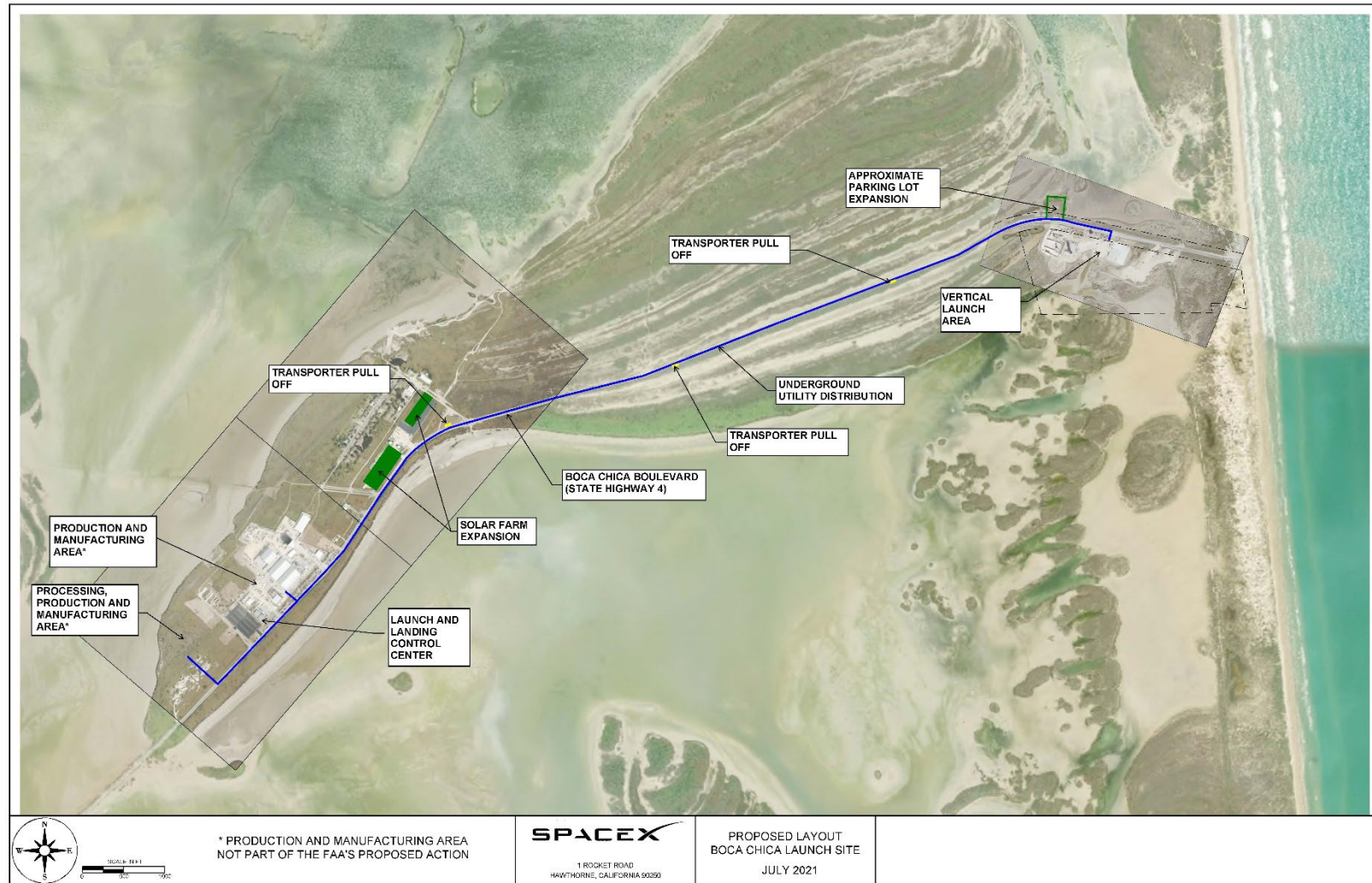




Figure A-5. Site Overview



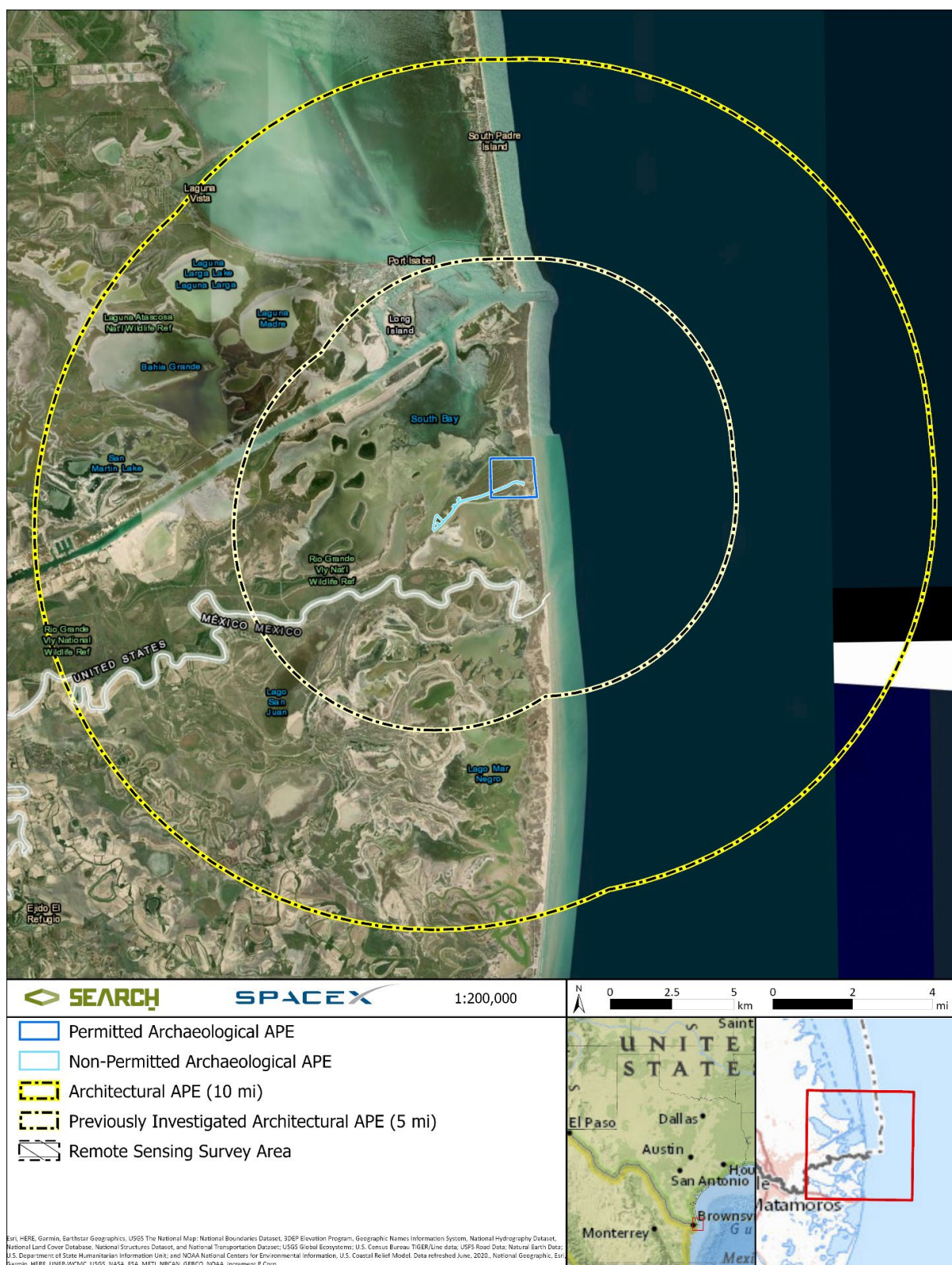
## ATTACHMENT B. AREA OF POTENTIAL EFFECTS

Figure B-1. Area of Potential Effects for Archeological Resources





### Figure B-2. Area of Potential Effects for Architectural Resources



## **ATTACHMENT C. HISTORIC PROPERTIES IDENTIFIED IN THE APEs AND RESOLUTION OF ADVERSE EFFECTS**

The following table lists the historic properties identified in the architectural and archaeological APEs for the SpaceX Boca Chica Launch Site and the FAA's determination of effect for each property. A description of each type of adverse effect (i.e., visual effects, auditory/vibration effects, visitation effects, and/or effects from launch anomalies) is identified in the table, and measures to resolve the adverse effects, are provided below.

### **Visual Effects**

- Description of effect – Visual effects would result from the introduction of new, permanent vertical industrial elements. This infrastructure would be intermittently visible to the casual observer; however, these elements would be located adjacent to other modern intrusions within the surrounding viewshed (i.e., wind turbines, cranes on the Brownsville Ship Channel, vertical industrial elements of SpaceX's private processing, manufacturing, and production facilities) and for the majority of the identified historic properties, would be indistinguishable from other vertical industrial infrastructure elements. Visual effects would also result from temporary and infrequent launch activity that would be visible for a brief period before receding from view.
- Resolution of effect – Visual effects will be resolved through underground utility line installation, completion of the historical context report, development of interpretive signage, and funding of educational outreach.

### **Auditory/Vibration Effects**

- Description of effect – Auditory and vibration effects would result from the Undertaking. The Occupational Safety and Health Administration (OSHA) guidelines to protect human hearing from Noise Induced Hearing Loss (NIHL) were used for daily noise exposure limits. The maximum daily limit based on OSHA's NIHL is 115 decibels (dB) for 0.25 or less. The noise from a Starship/Super Heavy orbital launch event will only last a few minutes and the OSHA 115 dB maximum daily limit levels decline beyond 2.4 miles from the launch pad. However, in the vicinity of eight historic resources, the sounds are still measured at between 100 and 110 dB. For vibration effects, impacts can be quantified using the Maximum Unweighted Sound Level ( $L_{max}$ ). Based on a study of structural damage during rocket static firing tests,  $L_{max}$  levels at 111 dB result in one damage claim per 1,000 structures exposed, and levels at 120 dB would result in one damage claim per 100 structures (Guest and Slone 1972). According to a noise modeling study conducted for the Project, Starship/Super Heavy orbital launch events are estimated to result in  $L_{max}$  levels of 120 dB up to 8.0 miles from the VLA.
- Resolution of effect – Auditory and vibration effects will be resolved through noise reduction of construction equipment, minimization of truck traffic noise, pre-launch vibration monitoring, and launch vibration monitoring. If the assessment determines that resources may be unlikely to withstand any elevated levels of vibration, SpaceX will hire a qualified professional to make recommendations for the stabilization and protection of



the resource. If permanent stabilization is necessary, it will be done following the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

### **Visitation Effects**

- Description of effect – The increase in visitors to the area because of launch activities could potentially lead to increased foot traffic and off-road use of the Palmito Ranch Battlefield NHL.
- Resolution of effect – Effects from increased visitation at the NHL will be resolved through maintenance of the soft checkpoint location, construction protection for the Palmetto Pilings 1936 Centennial Marker, and replication of missing Marker elements.

### **Effects from Launch Anomalies**

- Description of effect – Anomalies at the launch pad could generate debris that may impact cultural resources within the 700-acre area developed to assess potential effects of debris and debris retrieval, which includes the Palmetto Pilings 1936 Centennial Marker. One piling has been damaged by SpaceX anomaly debris. However, anomalies are expected to become increasingly unlikely as the Starship/Super Heavy program matures, and further damage to historic resources is unlikely.
- Resolution of effect – Effects from launch anomalies will be resolved through post-anomaly restoration. All work will be done following the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.

**Table C-1. Summary Table of Historic Properties Identified in the APEs for the SpaceX Boca Chica Launch Site**

<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</b>
National Register of Historic Places (NRHP) no. 93000266/ 41CF93/ THC (Archeological or Historic) Sites Atlas (THC Atlas) no. 2093000266	Palmito Ranch Battlefield NHL	Civil War Battlefield	NRHP Listed in 1993; Designated as National Historic Landmark (NHL) in 1997	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	Adverse effect (visual, visitation, introduction of new permanent industrial infrastructure.)
41CF117	Palmetto and Cypress Bridge Pilings	1846 and 1864-1865 historic bridge pilings	Eligible. Recommended under Criteria A and C	Intact physical remains (e.g., features, artifacts, datable materials) 52 of 55 known pilings contribute to 19th -century historic landscape along the Rio Grande.	Adverse effect (vibration, launch anomalies, visitation)
Texas Historical Marker (THM) no. 3917 (1936)	Palmetto Pilings 1936 Centennial Marker	Granite Marker	Eligible under Criterion A and meeting Criteria Consideration F	Social History. Associated with the long-standing tradition and one of the largest formal programs of commemoration in the state of Texas	Adverse effect (vibration, launch anomalies, visitation)
7061008405/5 061004076/TH C Historical Marker No. 4076 (1990)	Port Isabel Cemetery	Cemetery	Eligible under Criteria A, C, and D and meeting Criteria Consideration D	Ethnic History, Design, and potential to yield important information about nineteenth-century Tejano and Mexican cultural groups	Adverse effect (visual, auditory, vibration)

Section 106 PA for SpaceX Boca Chica Launch Site

Resource #	Resource Name	Site Type	National Register Eligibility	Historic Value	FAA Determination of Effect
BC-AH1	Queen Isabella Memorial Causeway, SH 100 over the Laguna Madre	1974 Concrete pier-and-beam bridge connecting Port Isabel and South Padre Island, second longest bridge in Texas	Eligible under Criteria A and C	Tourism and Economic Development and Engineering	Adverse effect (vibration)
BC-AH2	Long Island Swing Bridge, South Garcia Street over the Gulf Intracoastal Waterway	1953 pontoon-style swing bridge, one of two remaining pivot swing bridges in Texas	Eligible under Criteria A and C	Tourism and Economic Development and Engineering	Adverse effect (vibration)
THC Atlas no. 5061004143/THM no. 4143 (1991)	Queen Isabel Inn	Early 20th century Inn (ca. 1906)	Eligible under Criterion A	Tourism and Economic Development	Adverse effect (visual, auditory, vibration)
THC Atlas no. 5061004143/Recorded Texas Historic Landmark in 1988	Alta Vista Apartments	Early 20 <sup>th</sup> century apartment building (ca. 1931)	Eligible under Criteria A and C	Tourism and Economic Development, and Architecture	Adverse effect (visual, auditory, vibration)
NRHP no. 76002014/THC Atlas no. 2076002014/ State Antiquities Landmark/ 5061003780	Port Isabel Lighthouse (also known as the Point Isabel Lighthouse)	ca. 1852 Lighthouse	NRHP Listed in 1976 under Criterion A	Transportation and historic events	Adverse effect (visual, auditory, vibration)
THM no. 3780 (1936)	Old Point Isabel Lighthouse 1936 Centennial Marker	Commemorative Marker	Eligible under Criterion A and meeting Criteria Consideration F	Social History and historic events commemoration	Adverse effect (visual, auditory, vibration)
THC Atlas no. 5507014006/ THM no. 14006 (1996)	Charles Champion Building	20th century general store (ca. 1899), U.S. Customs House, and post office	Eligible under Criteria A, B, and C	Economic Development/association with historic personage/Architecture	Adverse effect (visual, auditory, vibration)

Section 106 PA for SpaceX Boca Chica Launch Site

<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</b>
Not applicable	Point Isabel Coast Guard Building	1923 Coast Guard building	Eligible under Criteria A and C	Transportation: Maritime and Maritime History and architecture	Adverse effect (visual, auditory, vibration)
Not applicable	Port Isabel Firemen's Hall	ca. 1950s structure	Eligible under Criterion A	Community planning and development	Adverse effect (visual, auditory, vibration)
Not applicable	Former Bahia Mar and Bahia Grande Condominiums	ca. 1975 condominiums	Eligible under Criteria A and C	Tourism and economic development and architecture	Adverse effect (visual, auditory)
Not applicable	Former Sea Island Resort Hotel	1959 resort hotel	Eligible under Criterion A	Tourism and economic development	Adverse effect (visual, auditory, vibration)
Not applicable	Former Ship Café Building	ca. 1940s café	Eligible under Criteria A and C	Tourism and economic development and architecture	Adverse effect (visual, auditory, vibration)
Not applicable	White Sands Motel	ca. 1950s motel	Eligible under Criterion A	Tourism and economic development	Adverse effect (visual, auditory, vibration)

**Table C-2. Magnetic Anomalies Representing Potential Submerged Cultural Resources**

<b>Magnetic Anomaly</b>	<b>Impact Area</b>	<b>Possible Source</b>	<b>Avoidance Buffer (m)</b>
M001/PM001	Magnetometer Survey Area	Possible Shipwreck	50
M003	Magnetometer Survey Area	Possible Shipwreck	50
M026/PM002	Magnetometer Survey Area	Possible Shipwreck	50
M088/PM003	Magnetometer Survey Area	Possible Shipwreck	50
M030/PM004	Magnetometer Survey Area	Unknown	50
M031/PM005	Magnetometer Survey Area	Unknown	50
M041/PM010	Magnetometer Survey Area	Unknown	50
M057	Magnetometer Survey Area	Unknown	50
M062/PM006	Magnetometer Survey Area	Unknown	50
M106/PM007	Magnetometer Survey Area	Unknown	50
M114/PM008	Magnetometer Survey Area	Unknown	50
M123/PM009	Magnetometer Survey Area	Unknown	50

**ATTACHMENT D. SPACEX BOCA CHICA LAUNCH SITE  
AND RELATED PLANS**

SpaceX has developed the following launch site and related plans:

- a. Anomaly Response Plan
- b. Access Restriction Notification Plan
- c. Lighting Management Plan
- d. Fire Mitigation and Response Plan
- e. Site Security Plan
- f. TXDOT Roadway Closure Traffic Control Plan
- g. Unanticipated Discoveries Plan
- h. Vibration Monitoring Plan

**ATTACHMENT E. SUMMARY OF TRIBAL CONSULTATION AND  
INVOLVEMENT DURING FAA’S ENVIRONMENTAL REVIEW OF THE  
PROPOSED UNDERTAKING**

The FAA identified the following 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, Tonkawa Tribe of Oklahoma, and Carrizo/Comecrudo Nation of Texas. 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 May 2, 2012) to Apache Tribe of Oklahoma, Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe of New Mexico, and Tonkawa Tribe of Oklahoma describing the Falcon Program Undertaking and inviting the tribes to participate in consultation. The FAA did not receive a response from any of the tribes.
- The FAA sent consultation letters (dated February 11, 2021) describing the current Undertaking and inviting Apache Tribe of Oklahoma, Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe of New Mexico, and Tonkawa Tribe of Oklahoma to participate in consultation. The FAA did not receive a response from any of the tribes.
- The FAA distributed the *Draft Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas*, dated September 17, 2021, inviting Apache Tribe of Oklahoma, Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe of New Mexico, Tonkawa Tribe of Oklahoma to comment on the draft document. The FAA did not receive a response from any of the tribes.
- The FAA sent a consultation letter (dated March 9, 2022) describing the current Undertaking and inviting Carrizo/Comecrudo Nation of Texas to participate as an interested party in consultation.

## 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.

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