ENVIRONMENTAL IMPACT STATEMENT

SPACEX STARSHIP-SUPER HEAVY LAUNCH VEHICLE AT LAUNCH COMPLEX 39A

at the Kennedy Space Center, Merritt Island, Florida

Final, Volume II, Appendix B.3, Part 5

January 2026

Federal Aviation Administration

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From: Zeringue, Katherine S. (KSC-SIE30)
To: Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); Long, Eva (FAA); Brian Pownall; Ward, Carmen J. [US-US]; tim.parsons@searchinc.com; Bill Werner
Cc: Steven.Sherman@icf.com; Schanel, Pam; Brooks, James T. (KSC-SIE30); Dankert, Donald J. (KSC-SIE30)
Subject: EXTERNAL: SpaceX SSH LC-39A CP Feedback on CRM Monitoring
Date: Monday, June 2, 2025 10:51:07 AM
Attachments: image001.png
image002.png
5_14_25 CCSFS Llighthouse SpaceX SSH Programmatic Agreement.pdf
SpaceX SSH Monitoring Plan Feedback Titusville.docx
SpaceX Starship Superheavy Monitoring Plan Feedback_SHPO Response.docx
5_29_25 STOF Monitoring Response NASA KSC SpaceX SSH.pdf
5_29_25 STOF NASA_SpaceX_StarshipSuperHeavy_AdditionalSitesforEvaluation_05-29-2025.xlsx
CNS Response Monitoring SpaceX SSH.pdf
SpaceX Starship Superheavy Monitoring Plan Feedback CNS.docx
5_13_25 N Brevard Heritage Fdn PA Feedback.pdf
5_24_25 N Brevard Heritage Responses Monitoring Qs.docx
Roz Foster Phys Article.pdf
Roz Foster SpaceX List of Articles.pdf
Roz Foster SpaceX NYT Article.pdf
Roz Foster SpaceX Starship's sonic boom article Seattle Times.pdf
SpaceX Starship Superheavy Monitoring Plan Feedback Roz Foster.docx

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Leidos Proprietary

Good Morning All,

We received feedback from the following groups related to inputs on the historic property monitoring plan for SpaceX SSH:

- SHPO
- Canaveral National Seashore
- Seminole Tribe of Florida
- Cape Canaveral Lighthouse Foundation
- City of Titusville
- North Brevard Heritage Foundation (Roz Foster)

I have attached the materials submitted. [redacted]

[redacted]

Thanks,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services

From: Roz Foster
To: Zeringue, Katherine S. (KSC-SIE30)
Subject: [EXTERNAL] RE: 4_12_25 SpaceX Starship Superheavy Consulting Party Meeting Historic Property List Handouts
Date: Tuesday, May 13, 2025 2:04:07 PM
Attachments: image001.png
image002.png

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I thought the meeting this morning was interesting and provided information to bring up some points for discussion and/or clarification.

1. Our main concern is the high frequency of sound produced during static test firings and launches. There are many variables that could possibly cause the sound frequency to increase such as barometric pressure, clouds, fog ,air temperature etc., which would be of concern if the dB increased form the baseline of 130dB to 150dB+. Would it be possible to design a sound deflector or barrier to harness sound during test firings and launches? Could it be a policy not to test fire or launch if barometric pressure and/or conditions that a would produce an increase in the baseline dB were present? Don't know how feasible this would be????
2. In my opinion, a case study of Saturn V static test firings and launches would be more compatible with Starship because of the size of engines, thrust, etc. and similar launch facilities and topography. Saturn V had 5 engines that generated 7 ½ lbs. of thrust compared to Starship that has 32 engines & I don't know how many lbs. of thrust they will produce. What is the variance between the two and what was the dB produced by Saturn V? I remember that everything shook and items fell off of the walls and shelves when one was launched.
3. It would also be feasible to study sound/pressure impact over a long period of time to determine what negative impacts are affecting structures, sites and environment. Are there procedures to follow for documentation & recording data? If there is a negative impact to a structure and/or site what guidelines are there that determines what is covered by Space X insurance and what are the limitations, etc.?

These are just some of my thoughts for discussion, Roz

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Tuesday, May 13, 2025 8:33 AM
To: kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Roz Foster <Roz@callhenry.com>; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; section106@muscogeenation.com; swaters@muscogeenation.com; lguthrie@muscogeenation.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade <Alissa.Lotane@dos.fl.gov>; Chase, Kelly L. <Kelly.Chase@dos.fl.gov>; Edwards, Scott <Scott.Edwards@dos.fl.gov>; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US] <KEVIN.D.AKSTULEWICZ@leidos.com>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>;

tim.parsons@searchinc.com; Bill Werner <Bill.Werner@searchinc.com>; Brooks, James T. (KSC-SIE30) <james.t.brooks-1@nasa.gov>; Long, Eva (FAA) <Eva.Long@faa.gov>; Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Brian Pownall <Brian.Pownall@spacex.com>; Ward, Carmen J. [US-US] <CARMEN.J.WARD@leidos.com>; Steven.Sherman@icf.com; Schanel, Pam <Pam.Schanel@icf.com>; Hall, Patrice (KSC-SIE30) <laura.p.hall@nasa.gov>; Thomson, Carmen M. <Carmen_Thomson@nps.gov>; Austin, Jay K. <JOHN.K.AUSTIN@leidos.com>
Subject: [EXTERNAL] 4_12_25 SpaceX Starship Superheavy Consulting Party Meeting Historic Property List Handouts

Good Morning All,

For quick reference, attached are lists of historic properties within the APE for SpaceX Starship superheavy launch and landings at NASA's Kennedy Space Center. Most of these lists are found in the Cultural Resource Assessment report that was previously distributed. We have updated the archaeology site list to include all archaeological sites recorded within the APE per tribal request.

Thank you,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From: Rebecca Zingarelli
To: Zeringue, Katherine S. (KSC-SIE30)
Cc: JAMES W GS-12 USSF SPOC 45 SW/MU DRAPER
Subject: [EXTERNAL] SpaceX Starship Superheavy Programmatic Agreement
Date: Wednesday, May 14, 2025 11:02:43 AM

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Hi Katherine,

Yesterday's session was very informative. Thank you for doing everything to ensure we understand what's going on.

After the meeting I spoke with Jamie Draper, the Museum Director for the Cape Canaveral Space Force Museum. I mentioned that you were looking for feedback on what historic properties might be included in the monitoring portion of the Programmatic Agreement. We agreed that for structures, the only two on the CCSFS we would recommend would be the Lighthouse and Hangar C, next door. Tom Penders would have to weigh in relative to the archaeological sites.

We know it's more complicated by the fact we have much closer launches to worry about, but the cumulative impact of SpaceX Starship launches could definitely add to that, especially over time.

If you didn't want to call them out specifically, we were thinking having a clause in the agreement to be able to add properties in the future that were not called out in the beginning, would give us all more flexibility as we gain experience with living with these launches.

Thanks again.

Very Respectfully,

Becky Zingarelli, Museum Director
Cape Canaveral Lighthouse
321-704-9194

SpaceX Starship Superheavy
Consulting Party Feedback for the Historic Property Monitoring Plan

Please use the following questions to provide feedback to NASA regarding the development of a historic preservation monitoring plan for SpaceX's Starship Superheavy launch and landing activities at LC-39A. These inputs will help us formulate the Programmatic Agreement.

What Should Be Monitored?

1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address. Most of the properties that are listed., especially those that are located on north Merritt Island, KSC and Cape Canaveral such as Elliott's Plantation, Ross Hammock, cemeteries, Cape Canaveral Lighthouse.
2. What specific historic property types and/or characteristics are you concerned about? I am especially concerned about NRHP or Eligible listings, cemeteries & archaeological sites

Where Should Monitoring Occur?

1. Which dB or psf levels are of most concern to you? Anything above 85db
2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)? Should use the same baseline for everything.

How Should Monitoring Be Accomplished?

1. Do you have any suggested methods or approaches for monitoring? Should be consistent throughout the APE. Modified Mercalli Intensity Scale. MMI scale measures the size of earthquake at different locations, taking into account factors like damage to buildings & the experience of people during the earthquake. Intensity vs. Magnitude: Magnitude measures the size of the earthquake source, intensity describes the shaking & damage caused by the earthquake at a special location. Possibly this method could be used to measure the surface-wave magnitude from sonic-boom overpressure/psf, vibration, etc?????
2. What specifically do you want to be monitored? Windows, plaster/walls, foundations/piers, brick/ stucco, chimneys, exterior masonry/walls, tombstones, monuments, archaeological remains/structures
3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE? I think using the same baseline would produce a good impact study in variable locations.
4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)? Depends what is involved, we're not scientists.

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both? Both
2. How often do you think reporting should occur? Depends on number of launches/static firings/landings in a given period of time which will depend on Space X schedule, possibly monthly.?? Monitoring should be done over an extended period of time to access cumulative effect.

Do you have any other comments, concerns, or recommendations? There is a Draft EIS for Authorizing Changes to the Falcon Launch Program At Vandenberg Space Force Base, CA May 2025 that has some

interesting information about impact of noise and vibration, resulting from launches/landings and static firings as follows: Launch & landing operations create engine noise & sonic. Noise levels would not exceed the OSHA thresholds for daily noise exposure limits. Residents within the area surrounding VBSFB would likely hear launch engine noise & sonic booms during return landings at VSFB. Noise-induced structural vibration during launches & landings caused by rocket engine noise & sonic booms may cause annoyance to building occupants in and around Lompoc, southeastern Santa Barbara, Ventura & northwestern Los Angeles Counties. (Note: *Lompoc is 9 miles and Santa Barbara is 57 miles from Vandenberg.)* Residents would hear occasional sonic booms, which would vary in impact location & levels depending on mission trajectories & weather conditions & may cause annoyance because of induced secondary vibrations or "rattle" of objects within buildings. Falson 9 & Falcon Heavy launches & landings have the potential to cause damage to some structures depending on the overpressure levels the structures are exposed to as well as the construction quality & condition of the structures. Damage associated with noise vibrations may occur to lightweight or brittle structural elements in poor condition, such as windows & plaster that are pre-cracked, prestressed, older and weakened, or poorly mounted: however, damage to windows & plaster in good condition & structural damage to building is not expected. Launches typically generate sonic booms over water which are not expected to damage structures. Sonic booms in some areas may rarely exceed 4 psf. Damage to structures is unlikely below 2 psf and more likely at 4psf & above. Overall, while 4psf sonic booms are more likely to cause damage compared to 2 psf, the extent of damage still depends on other factors, including construction quality & maintenance of structures. The impact of Sonic booms are dependent on launch trajectory, inclination & atmospheric conditions. The Study also addresses other concerns such as air quality, damage to wildlife & habitat, etc. and in my opinion would be worth reviewing.

Residents & local officials near Vandenberg have expressed concerns about noise and potential damage from sonic booms generated by Space X rocket launches. These launches, particularly recent ones involving Starship have caused vibrations that have been reported to rattle windows, set off car alarms and even loosen objects within homes. Some residents have described the booms as feeling like mini earthquakes. While Vandenberg has implemented measures to mitigate noise, such as limiting late night launches, concerns persist, especially as Space X aims to increase its launch cadence. Sonic booms can be heard & felt over considerable distance, with residents in areas like Lompoc & Santa Barbara reporting experiencing sonic booms. Concerns exist about the potential for structural damage caused by vibrations from sonic booms. Reports have indicated that launches have rattled windows, loosened light fixtures and knocked objects off shelves. Residents have expressed their concerns about their routines and quality of life being impacted. Vandenberg has taken steps to address noise concerns, including limiting midnight launches. They are also working on a collection & analysis to understand the impacts of launches. Larger Starship rocket launches are particularly impactful with some research suggesting that their sonic booms could potentially cause more structural damage than Falcon 9 launches.

I also looked up what is a normal, safe hearing level & according to the CDC it is generally considered to be at or below 70 decibels. Sounds above 85 db can cause hearing loss with prolonged exposure. Any sound at 120+ db can cause instant hearing loss. The more intense the sound & the longer the exposure, the greater the risk of damage.

I think this EIC study and possibly another at Boca Chico should be reviewed to provide additional information for evaluation of potential sonic boom noise damage over a extended period of time.

Submitted May 24, 2025 by Roz Foster, North Brevard Heritage Foundation, Inc.

From: Kneifl, Kristen R
To: Zeringue, Katherine S. (KSC-SIE30)
Cc: Thomson, Carmen M.; Rogers, Stephen C; Dennis, Meredith E
Subject: [EXTERNAL] Feedback Requested by 5/30: NASA KSC SpaceX Starship Superheavy Consulting Party Meeting #1
Date: Friday, May 30, 2025 10:12:16 AM
Attachments: image001.png
image002.png
SpaceX Starship Superheavy Monitoring Plan Feedback CNS.docx

Katherine,
Canaveral National Seashore does not have any specific recommendations for the monitoring plan and defers to the SHPO and THPO experts.

We still would like to be engaged in the process and appreciate the opportunity to be a consulting party.
Thank you,
Kristen

Kristen Kneifl
Chief of Resource Management
212 S. Washington Avenue
Titusville, Florida 32796
321-403-5680

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Thursday, May 15, 2025 12:55 PM
To: Kneifl, Kristen R <Kristen_Kneifl@nps.gov>; Dennis, Meredith E <Meredith_Dennis@nps.gov>; Rogers, Stephen C <Stephen_Rogers@nps.gov>; museumdirector@canaverallight.org <museumdirector@canaverallight.org>; thomas.penders@spaceforce.mil <thomas.penders@spaceforce.mil>; brad.parrish@titusville.com <brad.parrish@titusville.com>; sue.williams@titusville.com <sue.williams@titusville.com>; tabitha.armstrong@titusville.com <tabitha.armstrong@titusville.com>; titusvillehistory@gmail.com <titusvillehistory@gmail.com>; Kanaski, Richard <richard_kanaski@fws.gov>; roz@callhenry.com <roz@callhenry.com>; thpocompliance@semtribe.com <thpocompliance@semtribe.com>; DanielleSimon@semtribe.com <DanielleSimon@semtribe.com>; victoriamenchaca@semtribe.com <victoriamenchaca@semtribe.com>; jasonD@miccosukeetribe.com <jasonD@miccosukeetribe.com>; Section106 <Section106@muscogeenation.com>; swaters@muscogeenation.com <swaters@muscogeenation.com>; lguthrie@muscogeenation.com <lguthrie@muscogeenation.com>; Jeffery Harjo <harjo.je@sno-nsn.gov>; thpo <thpo@tttown.org>;

Lotane, Alissa Slade <Alissa.Lotane@dos.fl.gov>; Chase, Kelly L. <Kelly.Chase@dos.fl.gov>; Edwards, Scott <Scott.Edwards@dos.fl.gov>; CompliancePermits@dos.fl.gov <CompliancePermits@dos.fl.gov>; Akstulewicz, Kevin D. [US-US] <KEVIN.D.AKSTULEWICZ@leidos.com>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>; tim.parsons@searchinc.com <tim.parsons@searchinc.com>; Bill Werner <Bill.Werner@searchinc.com>; Brooks, James T. (KSC-SIE30) <james.t.brooks-1@nasa.gov>; Long, Eva (FAA) <Eva.Long@faa.gov>; Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Brian Pownall <Brian.Pownall@spacex.com>; Ward, Carmen J. [US-US] <CARMEN.J.WARD@leidos.com>; Steven.Sherman@icf.com <Steven.Sherman@icf.com>; Schanel, Pam <Pam.Schanel@icf.com>; Hall, Patrice (KSC-SIE30) <laura.p.hall@nasa.gov>; Ramos, Keith <keith_ramos@fws.gov>; Thomson, Carmen M. <Carmen_Thomson@nps.gov>; Austin, Jay K. <JOHN.K.AUSTIN@leidos.com>
Subject: [EXTERNAL] Feedback Requested by 5/30: NASA KSC SpaceX Starship Superheavy Consulting Party Meeting #1

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Hello All,

Thank you to those who were able to join us on Tuesday. I have attached a few items for your records:

- The PPT presentation
- Meeting minutes – if anyone has any edits or corrections, please forward those to me NLT May 30.
- Consulting Party Feedback Questionnaire – NASA KSC requested feedback from Consulting Parties related to the development of the historic property monitoring program. This questionnaire identifies the critical elements for which NASA KSC is seeking feedback. However, feel free to provide any information you feel is relevant. While we requested feedback from Consulting Parties by May 23 in the meeting, we are extending this to **May 30**.

I look forward to hearing from you by May 30. In the meantime, should you have any questions, feel free to reach out.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

-----Original Appointment-----
From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Wednesday, April 23, 2025 4:08 PM
To: Zeringue, Katherine S. (KSC-SIE30); kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; section106@muscogeenation.com; swaters@muscogeenation.com; lguthrie@muscogeenation.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30)
Cc: Thomson, Carmen M.; Austin, Jay K.
Subject: NASA KSC SpaceX Starship Superheavy Consulting Party Meeting #1
When: Tuesday, May 13, 2025 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Good Afternoon,

We look forward to meeting with you. Here is the agenda for the meeting:

-Welcome and Introductions
-Proposed Action Overview
-Historic Properties Summary
-Noise, Vibration, and Overpressure Overview
-Potential Effects to Historic Properties
-Programmatic Agreement
-Administrative Items (Next Steps)

I will also be sending out quick reference lists of historic properties separately (likely tomorrow morning before the meeting).

Sincerely,
Katherine Zeringue
NASA KSC Cultural Resources Manager

Microsoft Teams Need help?

Join the meeting now

Meeting ID: 285 991 844 971 1

Passcode: 9DX6bV6V

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City of Titusville, FL

SpaceX Starship Superheavy
Consulting Party Feedback for the Historic Property Monitoring Plan

Please use the following questions to provide feedback to NASA regarding the development of a historic preservation monitoring plan for SpaceX's Starship Superheavy launch and landing activities at LC-39A. These inputs will help us formulate the Programmatic Agreement.

What Should Be Monitored?

1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address.

   Below is a list of resources that are located in the municipal boundaries of the City of Titusville. Although located outside of the municipal boundaries, there are sites on Merritt Island that have an indirect impact on the City's heritage tourism economy. These include Elliott's Plantation, Ross Hammock, cemeteries and the Cape Canaveral Lighthouse.

422 Julia Street	*BR00425*
428 Julia Street	*BR00426*
602 Indian River Ave	*BR00393*
820 Indian River Ave	*BR00404*
902 Indian River Ave	*BR00407*
1120 Riverside Drive	*BR00479*
414 Pine Street [St. Gabriel's Episcopal Church/414-422 S Palm Avenue]	*8BR00177*
424 S. Washington Ave	*BR00524*
126 Grannis Ave	*Record Number 164*
214 Julia Street	*BR00421*
8 South Street	*BR00397*
1200 Riverside Drive	*BR00480*
703 Indian River Ave	*BR00399*
723 S. Palm Ave	*BR00470*
300 S. Washington Ave	*BR00508*
322 S. Washington Ave	*BR02886*
326 S. Washington Ave	*BR00515*
336 S. Washington Ave	*BR00521*
301 S. Washington Ave	*BR00509*
305 S. Washington Ave	*BR00510*
307 S. Washington Ave	*BR00511*
315 S. Washington Ave	*BR00512*
327 S. Washington Ave	*BR00516*
219 S. Washington Ave	*BR00507*
329 S. Washington Ave	*BR00517*

City of Titusville, FL

317 S. Washington Ave	*BR00513*
337 S. Washington Ave	*BR00520*
311 S. Washington Ave	*BR00511*
313 S. Washington Ave	*BR00512*
319 S. Washington Ave	*BR00513*
342 S. Washington Ave	*BR00522*
330-332 S. Washington Ave	*Record Number 6*
338-340 S. Washington Ave	*BR00521*
106 Main Street	*BR00429*
13 Main Street	*BR00427*
21 Main Street	*BR00428*
102 Julia Street	*BR00420*
106 Julia Street	*BR00420*
104 Julia Street	*BR00420*
112 Julia Street	*BR00420*
110 Julia Street	*BR00420*
Florida East Coast Railroad Station	*8BR00468*

2. What specific historic property types and/or characteristics are you concerned about?
   We are especially concerned about NRHP or Eligible listings, cemeteries & archaeological sites. Specific sites include the Pritchard House and the Florida East Coast Railroad Station and the Titusville National Historic District. NRHP and Locally designated sites outside of the district and east of the F.E.C. Railroad are an additional concern.

Where Should Monitoring Occur?

1. Which dB or psf levels are of most concern to you?
   Anything above 85db
2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)?
   Should use the same baseline for everything.

How Should Monitoring Be Accomplished?

1. Do you have any suggested methods or approaches for monitoring?
   Should be consistent throughout the APE. Modified Mercalli Intensity Scale. MMI scale measures the size of earthquake at different locations, taking into account factors like damage to buildings & the experience of people during the earthquake. Intensity vs. Magnitude: Magnitude measures the size of the earthquake source, intensity describes the shaking & damage caused by the earthquake at a special location. Possibly this method could be used to measure the surface-wave magnitude from sonic-boom overpressure/psf, vibration, etc. Another recommendation is periodic visual surveys with some crack gauges installed on walls facing the launch site for at least a year.

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City of Titusville, FL

2. What specifically do you want to be monitored?
   Windows, plaster/walls, foundations/piers, brick/ stucco, chimneys, tombstones, monuments, archaeological remains/structures, and especially exterior masonry/walls.
3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE?
   I think using the same baseline would produce a good impact study in variable locations.
4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)?
   Depends what is involved. Many sites are privately owned.

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both?
   Both. We request a year. At each launch event, one survey before launch and another after launch. The 1-year-long survey would allow adequate data collection for a representative sample size. Another reason is seasonal climate change. Existing distress conditions in buildings can experience cyclic changes with seasonal changes in weather and subgrade soil conditions. With a full year data, cyclic changes in existing distress condition can be identified, so they won't be attributed to sound pressure from launches.

2. How often do you think reporting should occur?
   Depends on number of launches/static firings/landings in a given period of time which will depend on Space X schedule, possibly monthly.?? Monitoring should be done over an extended period of time to access cumulative effect. At each launch event, one survey before launch and another after launch. The 1-year-long survey would allow adequate data collection for a representative sample size. Another reason is seasonal climate change. Existing distress conditions in buildings can experience cyclic changes with seasonal changes in weather and subgrade soil conditions. With a full year data, cyclic changes in existing distress condition can be identified, so they won't be attributed to sound pressure from launches.

Do you have any other comments, concerns, or recommendations?

There is a Draft EIS for Authorizing Changes to the Falcon Launch Program At Vandenberg Space Force Base, CA May 2025 that has some interesting information about impact of noise and vibration, resulting from launches/landings and static firings as follows: Launch & landing operations create engine noise & sonic. Noise levels would not exceed the OSHA thresholds for daily noise exposure limits. Residents within the area surrounding VBSFB would likely hear launch engine noise & sonic booms during return landings at VSFB. Noise-induced structural vibration during launches & landings caused by rocket engine noise & sonic booms may cause annoyance to building occupants in

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City of Titusville, FL

and around Lompoc, southeastern Santa Barbara, Ventura & northwestern Los Angeles Counties. (Note: Lompoc is 9 miles and Santa Barbara is 57 miles from Vandenberg.) Residents would hear occasional sonic booms, which would vary in impact location & levels depending on mission trajectories & weather conditions & may cause annoyance because of induced secondary vibrations or "rattle" of objects within buildings. Falson 9 & Falcon Heavy launches & landings have the potential to cause damage to some structures depending on the overpressure levels the structures are exposed to as well as the construction quality & condition of the structures. Damage associated with noise vibrations may occur to lightweight or brittle structural elements in poor condition, such as windows & plaster that are pre-cracked, prestressed, older and weakened, or poorly mounted: however, damage to windows & plaster in good condition & structural damage to building is not expected. Launches typically generate sonic booms over water which are not expected to damage structures. Sonic booms in some areas may rarely exceed 4 psf. Damage to structures is unlikely below 2 psf and more likely at 4psf & above. Overall, while 4psf sonic booms are more likely to cause damage compared to 2 psf, the extent of damage still depends on other factors, including construction quality & maintenance of structures. The impact of Sonic booms are dependent on launch trajectory, inclination & atmospheric conditions. The Study also addresses other concerns such as air quality, damage to wildlife & habitat, etc. and in my opinion would be worth reviewing.

Residents & local officials near Vandenberg have expressed concerns about noise and potential damage from sonic booms generated by Space X rocket launches. These launches, particularly recent ones involving Starship have caused vibrations that have been reported to rattle windows, set off car alarms and even loosen objects within homes. Some residents have described the booms as feeling like mini earthquakes. While Vandenberg has implemented measures to mitigate noise, such as limiting late night launches, concerns persist, especially as Space X aims to increase its launch cadence.
Sonic booms can be heard & felt over considerable distance, with residents in areas like Lompoc & Santa Barbara reporting experiencing sonic booms. Concerns exist about the potential for structural damage caused by vibrations from sonic booms. Reports have indicated that launches have rattled windows, loosened light fixtures and knocked objects off shelves. Residents have expressed their concerns about their routines and quality of life being impacted. Vandenberg has taken steps to address noise concerns, including limiting midnight launches. They are also working on a collection & analysis to understand the impacts of launches. Larger Starship rocket launches are particularly impactful with some research suggesting that their sonic booms could potentially cause more structural damage than Falcon 9 launches.

We reviewed information about what is a normal, safe hearing level & according to the CDC it is generally considered to be at or below 70 decibels. Sounds above

Page **4** of **5**

City of Titusville, FL

85 db can cause hearing loss with prolonged exposure. Any sound at 120+ db can cause instant hearing loss. The more intense the sound & the longer the exposure, the greater the risk of damage.

We believe this EIC study and possibly another at Boca Chico should be reviewed to provide additional information for evaluation of potential sonic boom noise damage over a extended period of time.

Submitted May 24, 2025 by

Roz Foster, North Brevard Heritage Foundation, Inc., Titusville Historic Preservation Board member.

Brad Parrish, AICP, Community Development Director, City of Titusville, FL

Page **5** of **5**

SpaceX Starship Superheavy
Consulting Party Feedback for the Historic Property Monitoring Plan

Please use the following questions to provide feedback to NASA regarding the development of a historic preservation monitoring plan for SpaceX's Starship Superheavy launch and landing activities at LC-39A. These inputs will help us formulate the Programmatic Agreement.

What Should Be Monitored?

1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address. **Defer to SHPO and THPO**
2. What specific historic property types and/or characteristics are you concerned about? **Defer to SHPO and THPO**

Where Should Monitoring Occur?

1. Which dB or psf levels are of most concern to you? **Defer to SHPO and THPO**
2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)? **Defer to SHPO and THPO.**

How Should Monitoring Be Accomplished?

1. Do you have any suggested methods or approaches for monitoring? **Defer to SHPO and THPO**
2. What specifically do you want to be monitored? **Defer to SHPO and THPO**
3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE? **Defer to SHPO and THPO**
4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)? **Yes**

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both? **Defer to SHPO and THPO.**
2. How often do you think reporting should occur? **Defer to SHPO and THPO.**

Do you have any other comments, concerns, or recommendations?

SpaceX Starship Superheavy
Consulting Party Feedback for the Historic Property Monitoring Plan

Please use the following questions to provide feedback to NASA regarding the development of a historic preservation monitoring plan for SpaceX's Starship Superheavy launch and landing activities at LC-39A. These inputs will help us formulate the Programmatic Agreement.

What Should Be Monitored?

1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address. Most of the properties that are listed., especially those that are located on north Merritt Island, KSC and Cape Canaveral such as Elliott's Plantation, Ross Hammock, cemeteries, Cape Canaveral Lighthouse.
2. What specific historic property types and/or characteristics are you concerned about? I am especially concerned about NRHP or Eligible listings, cemeteries & archaeological sites

Where Should Monitoring Occur?

1. Which dB or psf levels are of most concern to you? Anything above 85db
2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)? Should use the same baseline for everything.

How Should Monitoring Be Accomplished?

1. Do you have any suggested methods or approaches for monitoring? Should be consistent throughout the APE. Modified Mercalli Intensity Scale. MMI scale measures the size of earthquake at different locations, taking into account factors like damage to buildings & the experience of people during the earthquake. Intensity vs. Magnitude: Magnitude measures the size of the earthquake source, intensity describes the shaking & damage caused by the earthquake at a special location. Possibly this method could be used to measure the surface-wave magnitude from sonic-boom overpressure/psf, vibration, etc?????
2. What specifically do you want to be monitored? Windows, plaster/walls, foundations/piers, brick/ stucco, chimneys, exterior masonry/walls, tombstones, monuments, archaeological remains/structures
3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE? I think using the same baseline would produce a good impact study in variable locations.
4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)? Depends what is involved, we're not scientists.

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both? Both
2. How often do you think reporting should occur? Depends on number of launches/static firings/landings in a given period of time which will depend on Space X schedule, possibly monthly.?? Monitoring should be done over an extended period of time to access cumulative effect.

Do you have any other comments, concerns, or recommendations? There is a Draft EIS for Authorizing Changes to the Falcon Launch Program At Vandenberg Space Force Base, CA May 2025 that has some

interesting information about impact of noise and vibration, resulting from launches/landings and static firings as follows: Launch & landing operations create engine noise & sonic. Noise levels would not exceed the OSHA thresholds for daily noise exposure limits. Residents within the area surrounding VBSFB would likely hear launch engine noise & sonic booms during return landings at VSFB. Noise-induced structural vibration during launches & landings caused by rocket engine noise & sonic booms may cause annoyance to building occupants in and around Lompoc, southeastern Santa Barbara, Ventura & northwestern Los Angeles Counties. (Note: *Lompoc is 9 miles and Santa Barbara is 57 miles from Vandenberg.)* Residents would hear occasional sonic booms, which would vary in impact location & levels depending on mission trajectories & weather conditions & may cause annoyance because of induced secondary vibrations or "rattle" of objects within buildings. Falson 9 & Falcon Heavy launches & landings have the potential to cause damage to some structures depending on the overpressure levels the structures are exposed to as well as the construction quality & condition of the structures. Damage associated with noise vibrations may occur to lightweight or brittle structural elements in poor condition, such as windows & plaster that are pre-cracked, prestressed, older and weakened, or poorly mounted: however, damage to windows & plaster in good condition & structural damage to building is not expected. Launches typically generate sonic booms over water which are not expected to damage structures. Sonic booms in some areas may rarely exceed 4 psf. Damage to structures is unlikely below 2 psf and more likely at 4psf & above. Overall, while 4psf sonic booms are more likely to cause damage compared to 2 psf, the extent of damage still depends on other factors, including construction quality & maintenance of structures. The impact of Sonic booms are dependent on launch trajectory, inclination & atmospheric conditions. The Study also addresses other concerns such as air quality, damage to wildlife & habitat, etc. and in my opinion would be worth reviewing.

Residents & local officials near Vandenberg have expressed concerns about noise and potential damage from sonic booms generated by Space X rocket launches. These launches, particularly recent ones involving Starship have caused vibrations that have been reported to rattle windows, set off car alarms and even loosen objects within homes. Some residents have described the booms as feeling like mini earthquakes. While Vandenberg has implemented measures to mitigate noise, such as limiting late night launches, concerns persist, especially as Space X aims to increase its launch cadence. Sonic booms can be heard & felt over considerable distance, with residents in areas like Lompoc & Santa Barbara reporting experiencing sonic booms. Concerns exist about the potential for structural damage caused by vibrations from sonic booms. Reports have indicated that launches have rattled windows, loosened light fixtures and knocked objects off shelves. Residents have expressed their concerns about their routines and quality of life being impacted. Vandenberg has taken steps to address noise concerns, including limiting midnight launches. They are also working on a collection & analysis to understand the impacts of launches. Larger Starship rocket launches are particularly impactful with some research suggesting that their sonic booms could potentially cause more structural damage than Falcon 9 launches.

I also looked up what is a normal, safe hearing level & according to the CDC it is generally considered to be at or below 70 decibels. Sounds above 85 db can cause hearing loss with prolonged exposure. Any sound at 120+ db can cause instant hearing loss. The more intense the sound & the longer the exposure, the greater the risk of damage.

I think this EIC study and possibly another at Boca Chico should be reviewed to provide additional information for evaluation of potential sonic boom noise damage over a extended period of time.

Submitted May 24, 2025 by Roz Foster, North Brevard Heritage Foundation, Inc.

SpaceX Starship Superheavy
Consulting Party Feedback for the Historic Property Monitoring Plan

Please use the following questions to provide feedback to NASA regarding the development of a historic preservation monitoring plan for SpaceX's Starship Superheavy launch and landing activities at LC-39A. These inputs will help us formulate the Programmatic Agreement.

What Should Be Monitored?

1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address.

   The following list should not be considered exhaustive but known historic properties that are individually listed/eligible for the NRHP such as BR00177, BR00524, BR00397, BR00399, BR00480, BR01657, BR00581, BR00282, BR00211, BR02956, BR02906, BR01699, and BR02955 should be monitored.

   We also note there are unrecorded historic districts within the 2 psf APE and there may be additional historic properties that warrant monitoring.

2. What specific historic property types and/or characteristics are you concerned about?

   We are particularly concerned about historic glass, steeples, turrets, towers, plaster wall finishes, masonry, and tall multi-story structures.

Where Should Monitoring Occur?

1. Which dB or psf levels are of most concern to you?

   Levels of 2psf or greater.

2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)?

   Monitoring should be evenly dispersed throughout the non-federal terrestrial APE.

How Should Monitoring Be Accomplished?

1. Do you have any suggested methods or approaches for monitoring?

   We do not have any suggestion for monitoring methods.

2. What specifically do you want to be monitored?

   Vibratory, noise, and sonic boom in relation to historic properties and their character defining features.

3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE?

   We do not have any suggestion for monitoring methods.

4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)?

   We are willing to assist.

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both?

   A combination of both seems appropriate. Perhaps monitoring could be conducted more often during the initial implementation of the undertaking to confirm if the dB or psf levels modeled hold true and then the monitoring plan can be adjusted after an initial assessment/evaluation based on the data gathered.

2. How often do you think reporting should occur?

   Annually at a minimum.

Do you have any other comments, concerns, or recommendations?

We look forward to continuing consultation with NASA, FAA, NPS, and DoD.

From: Danielle Simon
To: Zeringue, Katherine S. (KSC-SIE30)
Cc: Victoria Menchaca; Juan Cancel; Tina Osceola
Subject: [EXTERNAL] RE: REMINDER Response due May 30 Re: Monitoring Plan: Tribal Specific Meeting - NASA KSC SpaceX Starship SuperheavyTim Parsons <tim.parsons@searchinc.com>
Date: Thursday, May 29, 2025 5:08:20 PM
Attachments: image003.png
image004.png
image005.png
NASA_SpaceX_StarshipSuperHeavy_AdditionalSitesforEvaluation_05-29-2025.xlsx
Importance: High

CAUTION: This email originated from outside of NASA. Please take care when clicking links or opening attachments. Use the "Report Message" button to report suspicious messages to the NASA SOC.

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE
THPO PHONE: (863) 983-6549
THPO TRIBAL CONSULTATION EMAIL: THPOCOMPLIANCE@SEMTRIBE.COM
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TRIBAL OFFICERS
MARCELLUS W. OSCEOLA JR. CHAIRMAN
HOLLY TIGER VICE CHAIRWOMAN
NAOMI R. WILSON SECRETARY
PETER A. HAHN TREASURER

May 29, 2025

Katherine Zeringue
Cultural Resources Manager
John F. Kennedy Space Center
Spaceport Integration & Services
Environmental Management Branch, SI-E3
Kennedy Space Center, FL 32899
Phone: 321-867-8454
Email: katherine.s.zeringue@nasa.gov

Subject: SpaceX Starship Super Heavy Launch and Reentry Vehicles at Launch Complex-39A, Kennedy Space Center, Cape Canaveral, Florida
THPO Compliance Tracking Number: 0034641

In order to expedite the THPO review process:

1. Please correspond via email and provide documents as attachments,
2. Please send all emails to THPOCompliance@semtribe.com,
3. Please reference the THPO Compliance Tracking Number if one has been assigned.

Dear Katherine Zeringue,

Thank you for contacting the Seminole Tribe of Florida Tribal Historic Preservation Office (STOF THPO) Compliance Section regarding the SpaceX Starship Super Heavy Launch and Reentry Vehicles at Launch Complex-39A, Kennedy Space Center, Cape Canaveral, Florida.

We have reviewed the documents and questionnaire for the historic preservation monitoring plan that you provided pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) as amended and its implementing regulations (36 CFR 800). In response, our office would like to provide the following feedback (in blue text):

What Should Be Monitored?

- Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address.
  - Historically, our office has not supported any form of data collection at burial resources. However, as the proposed undertaking is unprecedented in nature and the potential effects are unknown, and the monitoring methods as described at the May 16, 2025 Tribal Specific Meeting are non-invasive in nature, our office does not object to the inclusion of burial resource sites within the scope of this study provided continued consultation occurs to ensure all data is collected in an culturally appropriate/sensitive manner and reported in alignment with Section 304 of the National Historic Preservation Act.

  - Our office respectfully recommends the following sites as potential candidates for monitoring:

Site ID	Site Name
8BR00206	Pepper Hammock
8BR00151*	No Name
8BR00170	Opposite Futch Cove
8BR00774	Astronaut Road
8BR00913	Landfill South
8BR00914	LC 41 South
8BR00082	De Soto Grove Midden
8BR00082A*	De Soto Grove Midden A
8BR00083*	De Soto Grove Burial Mound
8BR00145*	Clark Slough
8BR00221*	No Name
8BR00078A	Dummett Midden
8BR00078B	Dummett Homestead
8BR00078D	Dummett's Grove
8BR00086*	Holmes Mound
8BR00139	Dummit Grove NE
8BR00143	Ragin Midden
8BR00232	No name
8BR00239*	Stinktown And Jeffords
8BR01619	Dummitt Creek North Midden
8BR01620	Southeast Of Nauman's Place
8BR01641	NS BR 6
8BR01872*	Sam's Site
8BR01933*	Little Midden
8BR00142*	Butler Campbell's Mound
8BR00155	Granny Cove
8BR01622	Allenhurst Midden
8BR01632	Edgar/Campbell Midden
8BR01673*	Haulover Sand Mound and Midden (A,B)

  - In the event additional candidates are needed, we have attached a selection of sites that may benefit from further archaeological investigation/formal evaluation to determine if they are suitable candidates for

monitoring at a later date or perhaps incorporation into a future adjacent study.

- What specific historic property types and/or characteristics are you concerned about?
  - As a guiding principle, our office is concerned for all cultural resources with indigenous affiliation. However, for the purposes of this consultation, pursuant to Section 106 and the legal considerations/protections afforded thereof, our office is focused on/concerned with sites of indigenous affiliation that are burial resources, and/or are potentially eligible and/or eligible for listing on the National Register of Historic Places. Sites that are listed as unevaluated or that do not have sufficient information for an eligibility recommendation should be treated as potentially eligible until further investigations are conducted.

Where Should Monitoring Occur?

- Which dB or psf levels are of most concern to you?
  - Our office is concerned about the potential effects to cultural resources within all dB or psf levels. As levels increase, so does our concern.

- Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)?
  - Monitoring should be evenly distributed across the entire APE. Ideally, multiple sites within each dB/psf level should be selected, monitored, and assessed to determine the scale, scope, and intensity of undertaking effects.

How Should Monitoring Be Accomplished?

- Do you have any suggested methods or approaches for monitoring?
  - Our office supports the use of seismographic sensors/sensor arrays as discussed/proposed at the May 16, 2025 Tribal Specific Meeting. Additionally, we respectfully recommend video cameras/recording devices are stationed at each site selected for monitoring to supplement (and potentially verify/validate) the data collected from seismographic sensors.

- What specifically do you want to be monitored?
  - To determine whether the proposed undertaking effects are adverse, our office proposes to monitor the aspects of integrity (as defined in the National Register Bulletin 15) for selected sites within the APE. As stratigraphic integrity is essential for both archaeological data collection/assessment and site eligibility, we would like to identify any changes to the archaeological deposits/components, such as displacement, subsidence, and/or alterations in artifact distribution that may occur and cannot be attributed to natural erosion or bioturbation

- Should there be variability in monitoring approaches depending upon location of the historic property within the APE?
  - To maintain consistency in the data, all sites selected for monitoring should use the same monitoring protocol/approaches.

- Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)?
  - Our office is available to discuss opportunities for future site inspections and/or other forms of collaboration as additional information becomes available/the monitoring plan is developed further.

How Long Should Monitoring Last?

- Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both? How often do you think reporting should occur?
    - Our office respectfully recommends the monitoring plan span a five-year period in order to fully assess direct, indirect, and cumulative effects from the proposed undertaking. Ideally, results would be reported on an annual basis.

Please continue to consult with our office and feel free to contact us with any questions or concerns. Thank you!

Respectfully,
Danielle A. Simon, MA, RPA
Compliance Manager
STOF THPO, Compliance Section
Email: daniellesimon@semtribe.com

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Thursday, May 29, 2025 8:27 AM
To: THPO Compliance <THPOCompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>; Victoria Menchaca <VictoriaMenchaca@semtribe.com>; JasonD@miccosukeetribe.com; Section106@muscogeenation.com; Jeffery Harjo <harjo.je@sno-nsn.gov>; thpo@tttown.org
Cc: Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Steven Sherman <steven.sherman@icf.com>; Schanel, Pam <pam.schanel@icf.com>; Long, Eva (FAA) <Eva.Long@faa.gov>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>; Bill Werner <Bill.Werner@searchinc.com>; Akstulewicz, Kevin D. [US-US] <KEVIN.D.AKSTULEWICZ@leidos.com>; Austin, Jay K. [US-US] <JOHN.K.AUSTIN@leidos.com>
Subject: REMINDER Response due May 30 Re: Monitoring Plan: Tribal Specific Meeting - NASA KSC SpaceX Starship SuperheavyTim Parsons <tim.parsons@searchinc.com>

Good Morning All,

If you haven't already provided your feedback regarding cultural resource monitoring efforts for this project, this is a reminder that I am seeking your feedback on the following items by tomorrow:

What Should Be Monitored?
1. Are there specific historic properties you recommend for monitoring? Please list them by Florida Master Site File Number or address.
2. What specific historic property types and/or characteristics are you concerned about?

Where Should Monitoring Occur?
1. Which dB or psf levels are of most concern to you?
2. Should monitoring sites be concentrated within specific dB or psf levels? Or should monitoring sites be distributed evenly across the entire Area of Potential Effects (APE)?

How Should Monitoring Be Accomplished?
1. Do you have any suggested methods or approaches for monitoring?
2. What specifically do you want to be monitored?
3. Should there be variability in monitoring approaches depending upon location of the historic property within the APE?

4. Is your organization willing to actively assist with monitoring activities (e.g. site inspections, measurements, photography)?

How Long Should Monitoring Last?

1. Should the monitoring plan be based on a time interval (e.g. 3 months), the number of events (e.g. 6 static fire/launch/landing events), or a combination of both?
2. How often do you think reporting should occur?

Do you have any other comments, concerns, or recommendations?

We look forward to continuing to work with you.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Monday, May 19, 2025 5:09 PM
To: Long, Eva (FAA) <Eva.Long@faa.gov>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>; Tim Parsons <tim.parsons@searchinc.com>; Bill Werner <Bill.Werner@searchinc.com>; Akstulewicz, Kevin D. [US-US] <KEVIN.D.AKSTULEWICZ@leidos.com>; Austin, Jay K. [US-US] <JOHN.K.AUSTIN@leidos.com>; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; Section106@muscogeenation.com; swaters@muscogeenation.com; Logan Guthrie <lguthrie@muscogeenation.com>; Jeffery Harjo <harjo.je@sno-nsn.gov>; thpo@tttown.org
Cc: Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Bremner, Paul M. (MSFC-ST13) <paul.m.bremner@nasa.gov>; Steven Sherman <steven.sherman@icf.com>; Schanel, Pam <pam.schanel@icf.com>
Subject: RE: Tribal Specific Meeting - NASA KSC SpaceX Starship Superheavy

Hello All,

Thank you to those who were able to join us on Friday. I have attached a few items for your records:

- The PPT presentation
- Meeting minutes – if anyone has any edits or corrections, please forward those to me NLT May 30.
- Consulting Party Feedback Questionnaire – NASA KSC requested feedback from Tribes related to the development of the historic property monitoring program. This questionnaire identifies the critical elements for which NASA KSC is seeking feedback. However, feel free to provide any information you feel is relevant. We request feedback from the Tribes NLT **May 30**.

I look forward to hearing from you by May 30. In the meantime, should you have any questions, feel free to reach out.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

-----Original Appointment-----
From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Friday, May 2, 2025 3:24 PM
To: Zeringue, Katherine S. (KSC-SIE30); Long, Eva (FAA); Hanson, Amy (FAA); Tim Parsons; Bill Werner; Akstulewicz, Kevin D. [US-US]; Austin, Jay K. [US-US]; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; Section106@muscogeenation.com; swaters@muscogeenation.com; Logan Guthrie; Jeffery Harjo; thpo@tttown.org
Cc: Dankert, Donald J. (KSC-SIE30); Bremner, Paul M. (MSFC-ST13); Steven Sherman; Schanel, Pam
Subject: Tribal Specific Meeting - NASA KSC SpaceX Starship Superheavy
When: Friday, May 16, 2025 9:00 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

We look forward to speaking with you on Friday. Since new Tribes will be joining us in the conversation, we will briefly cover the same materials as we did during Tuesday's meeting. However we intend to focus the conversation on archaeological resources, unless otherwise requested. We also intend to have a more in depth discussion related to a proposed archaeological monitoring methodology.

I have attached an Excel list of archaeological sites broken into psf ranges. If there is anything that we can provide prior to the meeting to enable meaningful discussion, please let me know.

Agenda:

-Welcome and Introductions
-Proposed Action Overview
-Historic Properties Summary
-Noise, Vibration, and Overpressure Overview
-Potential Effects to Historic Properties
-Programmatic Agreement
-Administrative Items (Next Steps)

Microsoft Teams Need help?

Join the meeting now

Meeting ID: 232 792 477 854 9
Passcode: p6pz2Kg3

Dial in by phone

+1 256-715-9946,,562317578# United States, Huntsville

Find a local number

Phone conference ID: 562 317 578#

For organizers: Meeting options | Reset dial-in PIN

ALERT: All meeting participants consent to, and will abide by, the terms and conditions viewable at the LEGAL link below. No ITAR/EAR content display or sharing without consent from Export Control.

Org help | Privacy and security

Site ID	Site Name	General Site Type	NRHP Status	psf Threshold
8BR00205	Max Hoeck Mound And Midden	Precontact mound(s)	Not evaluated	10
8BR00909	East Max Hoeck Creek Midden/Cana 78	Specialized site for procurement of raw materials	Not evaluated	10
8BR02077	Sarah	Campsite (precontact)	Insufficient Information	10
8BR00082B	De Soto Grove Midden B	Habitation (precontact)	Not evaluated	6
8BR00147	No name	Precontact shell midden	Not evaluated	6
8BR00148	No name	Precontact midden(s)	Not evaluated	6
8BR00150*	Oyster Prong Creek Mound	Precontact mound(s)	Not evaluated	6
8BR00158*	Penny Plot	Precontact burial(s)/ historic burial(s)/ homestead	Not evaluated	6
8BR00223*	Quarterman	Building remains/ historic burial(s)/farmstead	Insufficient Information	6
8BR00555	Eddy Creek Boat Launch Area	Habitation (precontact)	Not evaluated	6
8BR03152	Clark Slough Earthwork	Precontact mound(s)	Not evaluated	6
8BR00146	No name	Land-terrestrial	Insufficient Information	6
8BR00149	No name	Precontact midden(s)	Not evaluated	6
8BR00154	Eddy Creek	Precontact shell midden	Not evaluated	6
8BR00167	Payne's Midden	Precontact shell midden	Not evaluated	6
8BR00183	Pardon Island	Precontact shell midden	Not evaluated	6
8BR00556	Playalinda Beach Parking Area No. 8	Campsite (precontact)	Not evaluated	6
8BR01637	NS BR 2	Habitation (precontact)	Not evaluated	6
8BR01638	NS BR 3	Habitation (precontact)	Not evaluated	6
8BR01664	Archaic Surface Scatter Site	Land-terrestrial	Not evaluated	6
8BR02412	Gallinipper Basin #1	Specialized site for procurement of raw materials	Not evaluated	6
8BR02416	Gallinipper Basin #2	Specialized site for procurement of raw materials	Not evaluated	6
8BR03956	No name	Campsite (precontact)	Not evaluated	6
8BR00061	No name	Habitation (precontact)	Not evaluated	4
8BR00064*	Tiffin Mound	Precontact mound(s)	Ineligible	4
8BR00144	No name	Precontact midden(s)	Insufficient Information	4
8BR00156	No name	Precontact mound(s)	Not evaluated	4
8BR00161*	Cocoa Beach Mound	Possible mound	Not evaluated	4
8BR00184	Widgeon Bay	Specialized site for procurement of raw materials	Not evaluated	4
8BR00185	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR00227	No name	Specialized site for procurement of raw materials	Insufficient Information	4
8BR00062*	Moore Mound	Precontact mound(s)	Not evaluated	4
8BR00063*	Sams Mound	Precontact mound(s)	Not evaluated	4
8BR00077*	Naumans Place	Precontact burial(s)	Not evaluated	4
8BR00085*	Burns	Precontact mound(s)/ homestead	Insufficient Information	4
8BR00087	Gulbransen Mound	Precontact mound(s)/ homestead	Not evaluated	4
8BR00088A*	Hammock Mound A	Precontact mound(s)/ homestead	Not evaluated	4

8BR00088B	Hammock Mound B	Homestead	Not evaluated	4
8BR00088C	Hammock Mound C	Precontact shell midden/ possible mound(s)	Not evaluated	4
8BR00089*	Norris Mound	Precontact mound(s)/ homestead	Not evaluated	4
8BR00090*	Fuller Mound A	Precontact mound(s)	Not evaluated	4
8BR00091*	Fuller Mound B	Precontact mound(s)	Not evaluated	4
8BR00092	Fuller Mound C	Precontact mound(s)	Not evaluated	4
8BR00093*	Fuller Mound D	Precontact mound(s)	Not evaluated	4
8BR00094*	Fuller Mound E	Precontact mound(s)	Not evaluated	4
8BR00095	Fuller Mound F	Precontact mound(s)	Not evaluated	4
8BR01660*	New Lighthouse Site	Agriculture/ Farm structure/ building remains/homestead	Ineligible	4
8BR01890	Sams Creek Site	Land-terrestrial	Not evaluated	4
8BR01891	McDonalds Island	River/Stream/Creek-riverine	Not evaluated	4
8BR03276	The Brent Russell Midden		Not evaluated	4
8BR00240B	Hotel Site B	Habitation (precontact)	Not evaluated	4
8BR00566	UWF 2 & 4	Campsite (precontact)	Not evaluated	4
8BR01640	NS BR 5	Land-terrestrial	Not evaluated	4
8BR01642	NS BR 7	Habitation (precontact)	Insufficient Information	4
8BR01666	Marsh Crossing Artifact Scatter Site	Land-terrestrial	Not evaluated	4
8BR01668	Ceramic Surface Cluster Site	Land-terrestrial	Insufficient Information	4
8BR01669	Spoon Bill Site	Campsite (precontact)	Insufficient Information	4
8BR01695	Dr. Zoom	Land-terrestrial	Not evaluated	4
8BR01696	Sonic Boom	Land-terrestrial	Not evaluated	4
8BR01936*	Cabo Verde	Land-terrestrial	Ineligible	4
8BR01948	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR01949	Long Shore Midden	Specialized site for procurement of raw materials	Not evaluated	4
8BR01951	North Mangrove Midden	Specialized site for procurement of raw materials	Not evaluated	4
8BR01953	Shell Dipper	Specialized site for procurement of raw materials	Not evaluated	4
8BR01955	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR01956	Cut Corner Midden	Specialized site for procurement of raw materials	Not evaluated	4
8BR01958	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR01959	Canoer's Corner	Specialized site for procurement of raw materials	Not evaluated	4
8BR02175	97 Hammock	Land-terrestrial	Insufficient Information	4
8BR02351	Murray Parcel	Farmstead/ homestead	Not evaluated	4

8BR02413	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR02414	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR02415	No name	Specialized site for procurement of raw materials	Not evaluated	4
8BR02679	Turnstone Midden (2311.11)	Specialized site for procurement of raw materials	Not evaluated	4
8BR01854	Provost Site	Campsite (precontact)	Not evaluated	2,4
8BR01947	Bay Head Midden	Specialized site for procurement of raw materials	Not evaluated	2,4
8BR01945	Scorpion Dike	Specialized site for procurement of raw materials	Not evaluated	2,4
8BR00153	Pardon	Precontact midden(s)	Not evaluated	2
8BR00175	Fort Ann	Historic fort	Not evaluated	2
8BR01633	Apiary-53	Land-terrestrial	Insufficient Information	2
8BR01665	Old Canal Midden	Campsite (precontact)	Insufficient Information	2
8BR01670	Haulover Canal Midden	Building remains	Insufficient Information	2
8BR01672	Haulover Pond Midden Site	Campsite (precontact)	Insufficient Information	2
8BR01680	Relic Grove Site	Habitation (precontact)	Insufficient Information	2
8BR01857	Samela Site	Campsite (precontact)	Not evaluated	2
8BR01964	Pritchard House	Campsite (precontact)	Not evaluated	2
8BR02400*	Ulumay Lagoon	Precontact mound(s)	Not evaluated	2
8BR02675	Cactus Island Midden (2311.07)	Specialized site for procurement of raw materials	Not evaluated	2
8BR02678	Plover Midden (2311.10)	Specialized site for procurement of raw materials	Not evaluated	2
8BR04221	Cocoa Hill	Land-terrestrial	Insufficient Information	2
8BR04656*	Klondike	Land-terrestrial	Not evaluated	2
VO00151	Cat Hammock	Precontact shell midden	Not evaluated	2
VO00158	No name	Precontact shell midden	Not evaluated	2
VO00159	Vann's Island	Precontact shell midden	Not evaluated	2
VO06786	Kuhl Midden	Habitation (precontact)	Eligible	2
VO08977	Vann's Slough Midden	Specialized site for procurement of raw materials	Not evaluated	2
VO08978	Northwest of Vann's	Specialized site for procurement of raw materials	Not evaluated	2
VO09281	Teal Midden (2311.02)	Specialized site for procurement of raw materials	Not evaluated	2
VO09282	Mallard Midden (2311.03)	Specialized site for procurement of raw materials	Not evaluated	2

VO09283	Preacher's Island (2311.04)	Specialized site for procurement of raw materials	Not evaluated	2
VO09284	Merganser Midden (2311.05)	Specialized site for procurement of raw materials	Not evaluated	2
VO09285	Caracara Midden (2311.06)	Specialized site for procurement of raw materials	Not evaluated	2
8BR03279	Beachside Midden	Precontact shell mound(s)	Not evaluated	2
8BR03931	Thule's Rise	Campsite (precontact)	Insufficient Information	2
8BR02676	Harrier Midden (2311.08)	Specialized site for procurement of raw materials	Not evaluated	2
8BR02677	Kestrel Midden (2311.09)	Specialized site for procurement of raw materials	Not evaluated	2
8BR02229	Clifton Schoolhouse	Agriculture/ Farm structure/ homestead	Insufficient Information	2
8BR01942	No name	Specialized site for procurement of raw materials	Not evaluated	2
8BR01943	Dogs Cross	Specialized site for procurement of raw materials	Not evaluated	2
8BR01944	Dead Mangrove Island	Specialized site for procurement of raw materials	Not evaluated	2
8BR01946	No name	Specialized site for procurement of raw materials	Not evaluated	2
8BR01779	Woodward's Flat	Habitation (precontact)	Not evaluated	2
8BR00031	No name	Precontact mound(s)	Not evaluated	2
8BR00076	Haulover	Land-terrestrial	Not evaluated	2
8BR00152	No name	Precontact midden(s)	Not evaluated	2
8BR00159	No name	Artifact scatter-low density (< 2 per sq meter)	Not evaluated	2
8BR00160	Black Point Midden	Precontact midden(s)	Not evaluated	2
8BR01671	Haulover Artifact Scatter Site	Land-terrestrial	Insufficient Information	2
8BR01674	76th Street Nw Midden Site	Habitation (precontact)	Insufficient Information	2
8BR01675	Little Midden Point Site	Habitation (precontact)	Insufficient Information	2
8BR01677	Campbell/Jackson Sheet Midden	Land-terrestrial	Insufficient Information	2

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, July 9, 2025 4:29 PM
To: CompliancePermits@dos.fl.gov; Kelly Chase; Lotane, Alissa Slade; Edwards, Scott; kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; lori.price@jacobs.com; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Brian Pownall; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C; THRASH, SHERRY GS-13 USAF AFMC AFCEC/CZN
Cc: Akstulewicz, Kevin D. [US-US]; Ward, Carmen J. [US-US]; Long, Eva (FAA); Hanson, Amy (FAA); Zee, Stacey (FAA); Fineman, Michael (FAA); Steven.Sherman@icf.com; Schanel, Pam; Dankert, Donald J. (KSC-SIE30); Brooks, James T. (KSC-SIE30); Hall, Patrice (KSC-SIE30); Keith, Amy G. (MSFC-LD020); Tezel, Trevor O. (KSC-CC000); Borland, Curtis E. (HQ-MB000); Sosbee, Gretchen D. (LARC-MB000); Katy Groom; Kim Tice; Tim Parsons; Bill Werner
Subject: EXTERNAL: Review Requested: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A
Attachments: Recommended Site Monitoring List.xlsx; Consulting Party Monitoring Feedback Comment Response Matrix.xlsx; Comment Matrix for KSC LC 39A SSH PA.docx; 7_9_25 v1 DRAFT_KSC SSH Programmatic Agreement.pdf

Categories: Follow Up, Admin Record

Dear Consulting Party,

Attached is the first draft of the Programmatic Agreement for SpaceX Starship Superheavy operations at Kennedy's Space Center's Launch Complex 39-A. Please review and provide comment to me by **Friday, August 8, 2025** using the comment matrix.

I will schedule consulting party meetings during the 30-day review period in order to determine the monitoring sites and other details regarding the two monitoring programs (see comments/yellow highlights in the draft). This series of meetings is anticipated to begin the week of July 21. I intend to send out meeting invitations by the end of the week. To assist in your participation in these discussions, I have attached a high level summary of and response to consulting party submissions regarding the monitoring plan questionnaire, as well as the list of sites recommended for monitoring.

The next steps are as follows:

- August 8 – First Draft Programmatic Agreement review period closes
- August 9 – September 7 – comment adjudication and internal FAA/NASA review; this timeframe may also include targeted conversations with commenting parties
- September 8 – Final Draft Programmatic Agreement distributed to consulting parties for a 30-day review period (legal sufficiency review)
- October 8 – Final Draft Programmatic Agreement review period closes
- October 9 – 14 – FAA/NASA adjudicate final comments
- October 15 – Final Programmatic Agreement distributed to Signatories and Invited Signatories for signature
- NLT November 14 – final date for execution

1

If anyone has any questions or needs additional information, please let me know. We look forward to continuing to work with your organization in the development of this agreement.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

2

From: Zeringue, Katherine S. (KSC-SIE30)
To: kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000)
Cc: Katy Groom; Thomas Winant; Kate Willis; Katherine Hupp
Subject: RE: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 1)
Date: Wednesday, July 30, 2025 1:52:00 PM
Attachments: image001.png
image002.png
SpaceX vibrations 101 7-28-25.pdf
240265 SpaceX Structures Monitoring 7_28_25.pdf
7_28_25 SpaceX SSH Mtg Notes CP Mtg Bldg Monitoring Part 1 Draft.docx

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Good Afternoon,

Attached are the notes from our Consulting Party meeting on July 28, in addition to the presentations by STRAAM and SEARCH. If anyone has any edits to the meeting notes, please forward them to me by August 13, 2025.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

-----Original Appointment-----
From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Monday, July 14, 2025 4:26 PM
To: Zeringue, Katherine S. (KSC-SIE30); kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000)
Cc: Katy Groom; Thomas Winant; Kate Willis; Katherine Hupp

Subject: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 1)
When: Monday, July 28, 2025 1:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

The goal of this meeting is to determine the structures and buildings that will be monitored by NASA KSC. Please come prepared to discuss which specific structures you would like monitored. Those with clearly identified character-defining features, as well as those where your organization can assist with property access and/or monitoring will be prioritized. Note that monitoring sites may not be feasible due to private property access or other logistical challenges.

A follow-up meeting will occur on August 4 to discuss the monitoring methodology and reporting, both of which are dependent upon the specific buildings chosen for the monitoring program.

Agenda:
-Welcome and Introductions
-Structural Monitoring 101 Overview
-Determine structural monitoring sites
-Questions and next steps

From: Zeringue, Katherine S. (KSC-SIE30)
To: kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30)
Cc: Katy Groom; Thomas Winant; Kate Willis; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C
Subject: Revised Meeting Notes: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 1)
Date: Friday, August 15, 2025 9:29:00 AM
Attachments: image001.png
image002.png
7_28_25 SpaceX SSH Mtg Notes CP Mtg Bldg Monitoring Part 1 Revised.docx

Good Morning All,

We had one party request edits to notes for the Consulting Party meeting held on July 28, 2025. Attached is the revised document with the changes highlighted in yellow for ease of reference. As a reminder, if anyone has edits to the notes for the Consulting Party meeting held on August 4, 2025, please forward them to me no later than August 20.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

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SIE30) <donald.j.dankert@nasa.gov>; Brian Pownall <Brian.Pownall@spacex.com>; Ward, Carmen J. [US-US] <CARMEN.J.WARD@leidos.com>; Steven.Sherman@icf.com; Schanel, Pam <Pam.Schanel@icf.com>; Hall, Patrice (KSC-SIE30) <laura.p.hall@nasa.gov>; Tezel, Trevor O. (KSC-CC000) <trevor.o.tezel@nasa.gov>; Sosbee, Gretchen D. (LARC-MB000) <gretchen.d.sosbee@nasa.gov>
Cc: Katy Groom <Katy.Groom@spacex.com>; Thomas Winant <twinant@jandwcorp.com>; Kate Willis <kate.willis@searchinc.com>; Katherine Hupp <khupp@llw-law.com>
Subject: RE: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 1)

Good Afternoon,

Attached are the notes from our Consulting Party meeting on July 28, in addition to the presentations by STRAAM and SEARCH. If anyone has any edits to the meeting notes, please forward them to me by August 13, 2025.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

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From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Monday, July 14, 2025 4:26 PM
To: Zeringue, Katherine S. (KSC-SIE30); kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000)
Cc: Katy Groom; Thomas Winant; Kate Willis; Katherine Hupp
Subject: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 1)
When: Monday, July 28, 2025 1:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: Microsoft Teams Meeting

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A follow-up meeting will occur on August 4 to discuss the monitoring methodology and reporting, both of which are dependent upon the specific buildings chosen for the monitoring program.

Agenda:
-Welcome and Introductions
-Structural Monitoring 101 Overview
-Determine structural monitoring sites
-Questions and next steps

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, August 6, 2025 3:30 PM
To: kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30); JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C; Katy Groom; Kate Willis; Thomas Winant
Subject: EXTERNAL: Follow Up: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 2)
Attachments: 8_4_2025 SpaceX CP Mtg Structures Monitoring Part 2.pdf; 8_4_25 SpaceX SSH CP Mtg Bldg Monitoring Part 2 Notes.docx; 8_4_2025 SpaceX Structures Monitoring Proposed List_FINAL.pdf; Proposed Bldg Monitoring Site Map.jpg

Categories: Admin Record, Follow Up

Dear Consulting Party,

As a follow up to our August 4, 2025 Consulting Party meeting, attached are the following documents:

- Meeting presentation (8_4_2025 SpaceX CP Mtg Structures Monitoring Part 2)
- Meeting notes (8_4_25 SpaceX SSH Mtg Bldg Monitoring Part 2 Notes)
- Final proposed list of structures for the monitoring program (8_4_2025 SpaceX Structures Monitoring Proposed List_FINAL)
- Map showing the location of the proposed list of structures for the monitoring program (Proposed Bldg Monitoring Site Map)

Do-Outs

- Comments on v1 of the Programmatic Agreement are due this Friday, **August 8**.
- After discussion with FAA and SpaceX, we intend to move forward with the proposed building monitoring locations as agreed upon in the Consulting Party meeting and represented in the attached final list of proposed structures. If Consulting Parties have any further comments, please submit them no later than **August 20**.
- Any edits or revisions to the attached meeting notes are requested no later than **August 20**. As a reminder, any edits or revisions to the meeting minutes from our July 28, 2025 Consulting Party meeting are due **August 13**.

1

If you need anything or have questions, feel free to reach out.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

-----Original Appointment-----
From: Zeringue, Katherine S. (KSC-SIE30)
Sent: Monday, July 14, 2025 4:29 PM
To: Zeringue, Katherine S. (KSC-SIE30); kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; Price, Lori; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; roz@callhenry.com; thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Lotane, Alissa Slade; Chase, Kelly L.; Edwards, Scott; CompliancePermits@dos.fl.gov; Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); tim.parsons@searchinc.com; Bill Werner; Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Brian Pownall; Ward, Carmen J. [US-US]; Steven.Sherman@icf.com; Schanel, Pam; Hall, Patrice (KSC-SIE30)
Cc: Katy Groom; Thomas Winant; Kate Willis; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C
Subject: NASA KSC SpaceX Starship Superheavy - Consulting Parties Meeting - Structures Monitoring Program (Part 2)
When: Monday, August 4, 2025 1:00 PM-4:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

The goal of this meeting is to discuss the monitoring methodology and reporting intervals for the structures monitoring program. Methodology is dependent upon which structures are chosen in the July 28th meeting.

Microsoft Teams Need help?

Join the meeting now

Meeting ID: 278 585 895 137 8

Passcode: o3a3zh2k

Dial in by phone

+1 256-715-9946,,220250014# United States, Huntsville

Find a local number

Phone conference ID: 220 250 014#

2

For organizers: Meeting options | Reset dial-in PIN

ALERT: All meeting participants consent to, and will abide by, the terms and conditions viewable at the LEGAL link below. No ITAR/EAR content display or sharing without consent from Export Control.

Org help | Privacy and security

3

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Thursday, August 7, 2025 8:47 AM
To: Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); Brooks, James T. (KSC-SIE30); Long, Eva (FAA); Dankert, Donald J. (KSC-SIE30); Ward, Carmen J. [US-US]; tim.parsons@searchinc.com; Bill Werner; Brian Pownall
Cc: Steven.Sherman@icf.com; Schanel, Pam
Subject: EXTERNAL: FW: [EXTERNAL] RE: Review Requested: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A
Attachments: Comment Matrix for KSC LC 39A SSH PA_STOF Response.docx

Categories: Follow Up, Admin Record

CAUTION: This email originated from outside of Leidos.

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FYSA

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From: Danielle Simon <daniellesimon@semtribe.com>
Sent: Wednesday, August 6, 2025 7:20 PM
To: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Cc: Tina Osceola <TinaOsceola@semtribe.com>; Victoria Menchaca <VictoriaMenchaca@semtribe.com>; Michelle Diffenderfer <mdiffenderfer@llw-law.com>; Katherine Hupp <khupp@llw-law.com>; THPO Compliance <THPOCompliance@semtribe.com>
Subject: [EXTERNAL] RE: Review Requested: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A

CAUTION: This email originated from outside of NASA. Please take care when clicking links or opening attachments. Use the "Report Message" button to report suspicious messages to the NASA SOC.

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA

TRIBAL HISTORIC PRESERVATION OFFICE

THPO PHONE: (863) 983-6549

THPO TRIBAL CONSULTATION EMAIL: THPOCOMPLIANCE@SEMTRIBE.COM

THPO WEBSITE: WWW.STOFTHPO.COM

August 6, 2025

Katherine Zeringue
Cultural Resources Manager
John F. Kennedy Space Center
Spaceport Integration & Services
Environmental Management Branch, SI-E3
Kennedy Space Center, FL 32899
Phone: 321-867-8454
Email: katherine.s.zeringue@nasa.gov

Subject: SpaceX Starship Super Heavy Launch and Reentry Vehicles at Launch Complex-39A, Kennedy Space Center, Cape Canaveral, Florida; Draft Programmatic Agreement
THPO Compliance Tracking Number: 0034641

In order to expedite the THPO review process:

1. Please correspond via email and provide documents as attachments,
2. Please send all emails to THPOCompliance@semtribe.com
3. Please reference the THPO Compliance Tracking Number if one has been assigned.

Dear Katherine Zeringue,

Thank you for contacting the Seminole Tribe of Florida Tribal Historic Preservation Office (STOF THPO) Compliance Section regarding the *SpaceX Starship Super Heavy Launch and Reentry Vehicles at Launch Complex-39A, Kennedy Space Center, Cape Canaveral, Florida; Draft Programmatic Agreement.*

We have reviewed the documents that you provided pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) as amended and its implementing regulations (36 CFR 800). In response, our office respectfully submits the attached comment matrix for the first draft of the Programmatic Agreement, which details specific items of note. Additionally, based on the information currently available as it pertains to historic structures, we would like to emphasize our primary concern is the scale and scope of the cultural resource monitoring program. As we do not have previous baseline data on vibratory effects (equivalent to what will be produced by Starship Super Heavy) to archaeological sites/cultural resources in similar environments, per which we could extrapolate from or utilize to guide our study, our office is concerned that monitoring of only five events, as is proposed for the selected historic structures, would be insufficient for assessing potential direct, indirect, and cumulative effects, given that the proposed launch cadence will greatly exceed five events annually, and will, in theory, operate for years to come. Similarly, it is unlikely that a uniform sample size of seven, the sample size proposed for historic structures monitoring, for any subject within an area as large as a city would serve as a statistically robust representative sample to confidently extrapolate/infer from, let alone, seven distinct, individual cases/structure and/or site types. Ultimately, our office would like to ensure the study is sufficient, comprehensive, and robust enough in nature to where we can, as historic

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preservation practitioners, make informed, science-driven/based recommendations to best protect and preserve resources important to us all.

We look forward to continued consultation on the Programmatic Agreement. Our office will be able to provide formal/comprehensive comments on the proposed monitoring program as it relates to archaeological resources once further consultation takes place and additional information is made available. Furthermore, in an effort to streamline consultation, we respectfully request the opportunity to review and comment on a draft of the final Programmatic Agreement, in advance of its planned distribution. Otherwise, please continue to consult with our office and feel free to contact us with any questions or concerns.

Respectfully,
Danielle A. Simon, MA, RPA
Compliance Manager
STOF THPO, Compliance Section
Email: daniellesimon@semtribe.com

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, July 9, 2025 4:29 PM
To: CompliancePermits@dos.fl.gov; Kelly Chase <kelly.chase@dos.fl.gov>; Lotane, Alissa Slade <alissa.lotane@dos.fl.gov>; Edwards, Scott <scott.edwards@dos.fl.gov>; kristen_kneifl@nps.gov; Meredith_Dennis@nps.gov; Stephen_rogers@nps.gov; museumdirector@canaverallight.org; thomas.penders@spaceforce.mil; lori.price@jacobs.com; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; richard_kanaski@fws.gov; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife] <keith_ramos@fws.gov>; roz@callhenry.com; THPO Compliance <THPOCompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>; Victoria Menchaca <VictoriaMenchaca@semtribe.com>; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org; Brian Pownall <Brian.Pownall@spacex.com>; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; THRASH, SHERRY GS-13 USAF AFMC AFCEC/CZN <sherry.thrash@us.af.mil>
Cc: Akstulewicz, Kevin D. [US-US] <KEVIN.D.AKSTULEWICZ@leidos.com>; Ward, Carmen J. [US-US] <CARMEN.J.WARD@leidos.com>; Long, Eva (FAA) <Eva.Long@faa.gov>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>; Zee, Stacey (FAA) <Stacey.Zee@faa.gov>; Fineman, Michael (FAA) <Michael.Fineman@faa.gov>; Steven.Sherman@icf.com; Schanel, Pam <Pam.Schanel@icf.com>; Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Brooks, James T. (KSC-SIE30) <james.t.brooks-1@nasa.gov>; Hall, Patrice (KSC-SIE30) <laura.p.hall@nasa.gov>; Keith, Amy G. (MSFC-LD020) <amy.keith@nasa.gov>; Tezel, Trevor O. (KSC-CC000) <trevor.o.tezel@nasa.gov>; Borland, Curtis E. (HQ-MB000) <curtis.e.borland@nasa.gov>; Sosbee, Gretchen D. (LARC-MB000) <gretchen.d.sosbee@nasa.gov>; Katy Groom <Katy.Groom@spacex.com>; Kim Tice <Kim.Tice@spacex.com>; Tim Parsons <tim.parsons@searchinc.com>; Bill Werner <bill.werner@searchinc.com>
Subject: Review Requested: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A

Dear Consulting Party,

Attached is the first draft of the Programmatic Agreement for SpaceX Starship Superheavy operations at Kennedy's Space Center's Launch Complex 39-A. Please review and provide comment to me by **Friday, August 8, 2025** using the comment matrix.

I will schedule consulting party meetings during the 30-day review period in order to determine the monitoring sites and other details regarding the two monitoring programs (see comments/yellow highlights in the draft). This series of meetings is anticipated to begin the week of July 21. I intend to send out meeting invitations by the end of the week. To

assist in your participation in these discussions, I have attached a high level summary of and response to consulting party submissions regarding the monitoring plan questionnaire, as well as the list of sites recommended for monitoring.

The next steps are as follows:

- August 8 – First Draft Programmatic Agreement review period closes
- August 9 – September 7 – comment adjudication and internal FAA/NASA review; this timeframe may also include targeted conversations with commenting parties
- September 8 – Final Draft Programmatic Agreement distributed to consulting parties for a 30-day review period (legal sufficiency review)
- October 8 – Final Draft Programmatic Agreement review period closes
- October 9 – 14 – FAA/NASA adjudicate final comments
- October 15 – Final Programmatic Agreement distributed to Signatories and Invited Signatories for signature
- NLT November 14 – final date for execution

If anyone has any questions or needs additional information, please let me know. We look forward to continuing to work with your organization in the development of this agreement.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

4

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, September 3, 2025 5:41 PM
To: thpocompliance@semtribe.com; DanielleSimon@semtribe.com; VictoriaMenchaca@semtribe.com; Katherine Hupp; JasonD@miccosukeetribe.com; harjo.je@sno-nsn.gov; thpo@tttown.org
Cc: Tim Parsons; Dankert, Donald J. (KSC-SIE30); Akstulewicz, Kevin D. [US-US]; Hanson, Amy (FAA); Long, Eva (FAA); Hall, Patrice (KSC-SIE30)
Subject: EXTERNAL: NASA KSC: Update on Development of the Archaeological Monitoring Plan for the SpaceX Starship Superheavy Programmatic Agreement

Categories: Admin Record

CAUTION: This email originated from outside of Leidos.

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Greetings Everyone,

I wanted to provide an update on the continued development of the Archaeological Monitoring Plan for NASA KSC's SpaceX Starship Superheavy Programmatic Agreement. NASA had to work through some critical, logistical issues to ensure we would be able to carry out the Archaeological Monitoring Plan as originally envisioned and discussed with the Tribes. These issues were identified immediately prior to the 7/30/25 meeting resulting in its last minute cancellation. I am happy to say that we are finally ready to pick back up where we left off in July.

This is what NASA hopes to achieve between now and October 14, 2025, prior to the distribution of the final Programmatic Agreement for execution:

- The second draft of the PA will be distributed on 9/8/25 with placeholder language regarding the development of the Archaeological Monitoring Plan. NASA commits to ensuring that the plan is finalized in consultation prior to the first SpaceX Starship Superheavy launch occurring at KSC.
- Between 9/8 – 10/14, NASA will hold meetings with the Tribes, SHPO, and relevant federal agencies to finalize the Archaeological Monitoring Plan.
- Once the language for the Plan is developed, it will be distributed to the relevant parties for review and comment.
- If the Archaeological Monitoring Plan is finalized by 10/14, NASA will insert it into the Programmatic Agreement replacing the current placeholder language. If NASA cannot finalize the Archaeological Monitoring Plan prior to the distribution of the final PA on 10/15/25, the placeholder language will remain in the PA and NASA will continue to consult with the Tribes until the plan is finalized and prior to the first SpaceX Starship Superheavy launch occurring at KSC.

I will be on annual leave from 9/4 – 9/28/25. In my absence, NASA has authorized Tim Parsons with SEARCH to take lead on scheduling upcoming meetings with you all and leading the discussions. NASA representatives (my boss) will be in attendance at those meetings, so representative from the federal agency will be present. During my absence, should you have any questions or concerns, feel free to reach out to:

- Don Dankert, Branch Chief for NASA KSC's Environmental Management Branch (my boss) at 321-222-8825 or donald.j.dankert@nasa.gov OR
- Tim Parsons, Director, SEARCH Florida – Tallahassee at 850-766-4088 or tim.parsons@searchinc.com

1

We look forward to continuing to work with you on the development of this important part of the Programmatic Agreement.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

Akstulewicz, Kevin D. [US-US]

From: Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>
Sent: Monday, September 8, 2025 1:54 PM
To: CompliancePermits@dos.fl.gov; Kelly Chase; Alissa M. Lotane; Edwards, Scott; Long, Eva (FAA); Hanson, Amy (FAA); Zee, Stacey (FAA); Fineman, Michael (FAA); Sherman, Steven; Schanel, Pam; Dankert, Donald J. (KSC-SIE30); Brooks, James T. (KSC-SIE30); Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000); Katy Groom; Brian Pownall; Kneifl, Kristen R; Dennis, Meredith E; Rogers, Stephen C; PENDERS, THOMAS E GS-12 USSF SPOC 45 CES/CEIE; Price, Lori; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE; THRASH, SHERRY E CIV USAF AFMC AFCEC/CIEE; Kanaski, Richard; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; museumdirector@canaverallight.org; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; Roz@callhenry.com; THPO Compliance; Danielle Simon; Victoria Menchaca; khupp@llw-law.com; Jason Daniel; harjo.je@sno-nsn.gov; thpo@tttown.org; Akstulewicz, Kevin D. [US-US]; Thomson, Carmen M.; tim.parsons@searchinc.com; Bill Werner
Subject: EXTERNAL: Review Requested by 10/8/2025: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A
Attachments: 9_3_2025 v2 Internal DRAFT KSC SSH PA.pdf; Comment Matrix for KSC LC 39A SSH PA.docx; Consulting Party Comments v1 SpaceX SSH PA.xlsx

Categories: Admin Record

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Dear Consulting Party,

Attached is the second draft of the Programmatic Agreement (PA) for SpaceX Starship Superheavy operations at Kennedy's Space Center's Launch Complex 39-A. The attached comment matrix captures all comments received by the Consulting Parties on the first draft. NASA responded to each comment so you can understand how your comments were addressed and/or get answers to your questions. Please review and provide comments on the second draft of the PA to Katherine Zeringue by **Wednesday, October 8, 2025** using the attached blank comment matrix.

Next steps are as follows:

- October 8: Second Draft Programmatic Agreement review and comment period closes
- October 9 – October 14: FAA/NASA adjudicate final comments and finalize the Programmatic Agreement
- October 15: Final Draft Programmatic Agreement distributed to Consulting Parties. Signatories and Invited Signatories route for signature.
- NLT November 14: Final date for execution

If anyone has any questions or needs additional information, please contact me OR you may contact Katherine Zeringue (Katherine.s.zeringue@nasa.gov) starting September 29 when she returns from leave. We look forward to continuing to work with your organization in the development of this agreement.

1

Sincerely,
Don Dankert

Donald Dankert
Chief, Environmental Management Branch
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-861-1196
M: 321-222-8825
donald.j.dankert@nasa.gov

2

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, October 1, 2025 10:21 AM
To: CompliancePermits@dos.fl.gov; Kelly Chase; Alissa M. Lotane; Edwards, Scott; Long, Eva (FAA; Hanson, Amy (FAA; Zee, Stacey (FAA; Fineman, Michael (FAA; Sherman, Steven; Schanel, Pam; Dankert, Donald J. (KSC-SIE30); Brooks, James T. (KSC-SIE30); Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000); Katy Groom; Brian Pownall; Kneifl, Kristen R; Dennis, Meredith E; Rogers, Stephen C; PENDERS, THOMAS E GS-12 USSF SPOC 45 CES/CEIE; Price, Lori; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE; THRASH, SHERRY E CIV USAF AFMC AFCEC/CIEE; Kanaski, Richard; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife; museumdirector@canaverallight.org; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; Roz@callhenry.com; THPO Compliance; Danielle Simon; Victoria Menchaca; khupp@llw-law.com; Jason Daniel; harjo.je@sno-nsn.gov; thpo@tttown.org; Akstulewicz, Kevin D. [US-US]; Thomson, Carmen M.; tim.parsons@searchinc.com; Bill Werner
Subject: EXTERNAL: REMINDER - Comments Due 10/8/2025: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A
Attachments: 9_3_2025 v2 Internal DRAFT KSC SSH PA.pdf; Comment Matrix for KSC LC 39A SSH PA.docx; Consulting Party Comments v1 SpaceX SSH PA.xlsx

Categories: Admin Record

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Dear Consulting Party,

This is a reminder that comments are due on the second draft of the Programmatic Agreement (PA) for SpaceX Starship Superheavy operations at Kennedy's Space Center's Launch Complex 39-A next **Wednesday, October 8**. Please forward them to me when complete. During the furlough, NASA has been authorized to continue to advance this project. As of right now, we anticipate meeting the deadlines and milestones outlined below. If that changes, I will let you know.

In the meantime, we continue to look forward to working with you on developing this document. If you have any questions or need anything, please reach out (understanding my response times may be slightly delayed).

Sincerely,

1

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From: Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>
Sent: Monday, September 29, 2025 11:08 AM
To: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Subject: FW: Review Requested by 10/8/2025: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A

From: Dankert, Donald J. (KSC-SIE30)
Sent: Monday, September 8, 2025 1:54 PM
To: CompliancePermits@dos.fl.gov; Kelly Chase <kelly.chase@dos.fl.gov>; Alissa M. Lotane <alissa.lotane@dos.fl.gov>; Edwards, Scott <scott.edwards@dos.fl.gov>; Long, Eva (FAA) <Eva.Long@faa.gov>; Hanson, Amy (FAA) <Amy.Hanson@faa.gov>; Zee, Stacey (FAA) <Stacey.Zee@faa.gov>; Fineman, Michael (FAA) <michael.fineman@faa.gov>; Sherman, Steven <steven.sherman@icf.com>; Schanel, Pam <pam.schanel@icf.com>; Dankert, Donald J. (KSC-SIE30) <donald.j.dankert@nasa.gov>; Brooks, James T. (KSC-SIE30) <james.t.brooks-1@nasa.gov>; Hall, Patrice (KSC-SIE30) <laura.p.hall@nasa.gov>; Tezel, Trevor O. (KSC-CC000) <trevor.o.tezel@nasa.gov>; Sosbee, Gretchen D. (LARC-MB000) <gretchen.d.sosbee@nasa.gov>; Katy Groom <katy.groom@spacex.com>; Brian Pownall <brian.pownall@spacex.com>; Kneifl, Kristen R <kristen_kneifl@nps.gov>; Dennis, Meredith E <meredith_dennis@nps.gov>; Rogers, Stephen C <stephen_rogers@nps.gov>; PENDERS, THOMAS E GS-12 USSF SPOC 45 CES/CEIE <thomas.penders@spaceforce.mil>; Price, Lori <lori.price@jacobs.com>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; THRASH, SHERRY E CIV USAF AFMC AFCEC/CIEE <sherry.thrash@us.af.mil>; Kanaski, Richard <richard_kanaski@fws.gov>; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife] <kramos2@ndc.nasa.gov>; museumdirector@canaverallight.org; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; Roz@callhenry.com; THPO Compliance <thpocompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>; Victoria Menchaca <victoriamenchaca@semtribe.com>; khupp@llw-law.com; Jason Daniel <jasond@miccosukeetribe.com>; harjo.je@sno-nsn.gov; thpo@tttown.org; Akstulewicz, Kevin D. [US-US] <kevin.d.akstulewicz@leidos.com>; Thomson, Carmen M. <carmen_thomson@nps.gov>; tim.parsons@searchinc.com; Bill Werner <bill.werner@searchinc.com>
Subject: Review Requested by 10/8/2025: SpaceX Starship Superheavy Programmatic Agreement Specific to Kennedy Space Center/LC-39A

Dear Consulting Party,

Attached is the second draft of the Programmatic Agreement (PA) for SpaceX Starship Superheavy operations at Kennedy's Space Center's Launch Complex 39-A. The attached comment matrix captures all comments received by the Consulting Parties on the first draft. NASA responded to each comment so you can understand how your comments were addressed and/or get answers to your questions. Please review and provide comments on the second draft of the PA to Katherine Zeringue by **Wednesday, October 8, 2025** using the attached blank comment matrix.

2

Next steps are as follows:

- October 8: Second Draft Programmatic Agreement review and comment period closes
- October 9 – October 14: FAA/NASA adjudicate final comments and finalize the Programmatic Agreement
- October 15: Final Draft Programmatic Agreement distributed to Consulting Parties. Signatories and Invited Signatories route for signature.
- NLT November 14: Final date for execution

If anyone has any questions or needs additional information, please contact me OR you may contact Katherine Zeringue (Katherine.s.zeringue@nasa.gov) starting September 29 when she returns from leave. We look forward to continuing to work with your organization in the development of this agreement.

Sincerely,
Don Dankert

Donald Dankert
Chief, Environmental Management Branch
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-861-1196
M: 321-222-8825
donald.j.dankert@nasa.gov

Akstulewicz, Kevin D. [US-US]

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Wednesday, October 22, 2025 5:59 PM
To: Kneifl, Kristen R; Dennis, Meredith E; Rogers, Stephen C; PENDERS, THOMAS E GS-12 USSF SPOC 45 CES/CEIE; Price, Lori; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE; THRASH, SHERRY E CIV USAF AFMC AFCEC/CIEE; Kanaski, Richard; Ramos, Keith (KSC-USFWS)[US Fish and Wildlife]; museumdirector@canaverallight.org; brad.parrish@titusville.com; sue.williams@titusville.com; tabitha.armstrong@titusville.com; titusvillehistory@gmail.com; Roz@callhenry.com; Thomson, Carmen M.
Cc: CompliancePermits@dos.fl.gov; Kelly Chase; Alissa M. Lotane; Edwards, Scott; Long, Eva (FAA; Hanson, Amy (FAA; Zee, Stacey (FAA; Fineman, Michael (FAA; Sherman, Steven; Schanel, Pam; Dankert, Donald J. (KSC-SIE30); Brooks, James T. (KSC-SIE30); Hall, Patrice (KSC-SIE30); Tezel, Trevor O. (KSC-CC000); Sosbee, Gretchen D. (LARC-MB000); Katy Groom; Bill Werner; Brian Pownall; THPO Compliance; Danielle Simon; Victoria Menchaca; khupp@llw-law.com; Jason Daniel; harjo.je@sno-nsn.gov; thpo@tttown.org; tim.parsons@searchinc.com; Akstulewicz, Kevin D. [US-US]
Subject: EXTERNAL: For Your Records: Final Programmatic Agreement for SpaceX Starship Superheavy at Kennedy Space Center/LC-39A
Attachments: 10_22_25 Final KSC SSH PA Track Changes.docx; 10_22_25 Final KSC SSH PA Clean.pdf; 10_22_25 Consulting Party Comments v2 SpaceX SSH PA KSC.xlsx

Categories: Admin Record, Follow Up

CAUTION: This email originated from outside of Leidos.

Be cautious when clicking or opening content.

Dear Consulting Party,

Thank you for participating in Section 106 consultation to develop the Programmatic Agreement for SpaceX Starship Superheavy Operations at Kennedy Space Center's Launch Complex 39A (PA). Attached is the final version of the document for your records. **No action is required of you at this time.** This version has been distributed to the Signatories and Invited Signatories for their signature. NASA expects the document to be executed by November 22, 2025. Once that occurs, NASA will forward a signed version of the PA to you.

For your records, attached is a:

- PDF version of the final Programmatic Agreement (unsigned)
- Word version with track changes so you can see where edits were made between version 2 (distributed on 9/8/2025) and the final version
- Comment matrix documenting consulting party comments and NASA's response

Additionally, a final version of the Cultural Resource Assessment Survey (CRAS) can be downloaded from SEARCH's SharePoint site at the following link: Final CRAS Distribution 10_2025
As you will note, the CRAS is referenced within the PA and will be used during the PA's implementation. Minor changes within the CRAS, which was initially distributed on March 17, 2025, reflect comments and requests from Consulting Parties. The changes include the addition of all archaeological sites within the APE. Should you have

1

any issues downloading the document, please contact Tim Parson's directly at tim.parsons@searchinc.com or 850-766-4088.

NASA looks forward to continuing to work with you as we begin to implement the terms of the Programmatic Agreement. In the meantime, should you have any questions or concerns, please let me know.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
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B.3.3 NHPA Section 106 Cultural Resources Assessment

SEARCH

FINAL

CULTURAL RESOURCE SURVEY FOR THE STARSHIP-SUPER HEAVY PROJECT AT LC-39A, KENNEDY SPACE CENTER BREVARD COUNTY, FLORIDA

SEARCH PROJECT NO. 240265

PREPARED FOR

LEIDOS

1140 EGLIN PARKWAY

SHALIMAR, FL 32579

BY

SEARCH

OCTOBER 2025

CULTURAL RESOURCE SURVEY FOR THE STARSHIP-SUPER HEAVY PROJECT AT LC-39A, KENNEDY SPACE CENTER BREVARD COUNTY, FLORIDA

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KATE WILLIS, ANGELIQUE THERIOT, ALEXIS THOMAS, AND LEEANNE MAHONEY

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SEARCHINC.COM

OCTOBER 2025

EXECUTIVE SUMMARY

SpaceX proposes to use Launch Complex 39A (LC-39A) to support Starship Super Heavy (SSH) operations at the National Aeronautics and Space Administration Kennedy Space Center (NASA KSC) in Brevard County, Florida (Proposed Action). The Proposed Action is the issuance of a Vehicle Operator License to SpaceX from the Federal Aviation Administration (FAA) to support SSH launch and landing operations at LC-39A, including ocean landings of SSH in the Atlantic Ocean on floating platforms (droneships), or directly in the ocean as a contingency. Associated activities include infrastructure construction at LC-39A and ground, launch, and landing operations associated with SSH. The FAA has determined that the Proposed Action is an undertaking requiring compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA; United States Code [U.S.C.] Title 54, Section 306108). The FAA is also preparing an environmental impact statement under the National Environmental Policy Act to evaluate the potential environmental impacts of the Proposed Action. Similarly, NASA KSC has determined the associated activities at LC-39A constitute and undertaking requiring compliance with Section 106. NASA KSC is acting as the lead federal agency for compliance with Section 106 of the NHPA. Section 106 will be conducted pursuant to the 2009 *Programmatic Agreement Among the National Aeronautics and Space Administration, John F. Kennedy Space Center, Advisory Council on Historic Preservation, and the Florida State Historic Preservation Officer: Regarding Management of Historic Properties at the Kennedy Space Center,* or any subsequent version thereof.

Southeastern Archaeological Research LLC (SEARCH) completed this report in compliance with the regulations implementing Section 106 of the NHPA (Code of Federal Regulations [CFR] Title 36, Part 800), and in accordance with Florida Administrative Code, Chapter 1A-46. The approach for the identification of historic properties in this report was developed in consultation with NASA KSC, the FAA, and the Florida State Historic Preservation Officer (SHPO). The report presents the results of background research, desktop-level review of previously recorded historic properties (architectural history and archaeological resources), intensive architectural history field survey of historic properties, and a windshield architectural history survey.

The area of potential effects (APE) has been developed by NASA KSC and the FAA to consider both a construction APE and an operational APE. The construction APE is limited to the existing boundaries of LC-39A. The operational APE is predicated on the auditory and vibratory effects of the SSH launch activity, as well as the overpressure effects of the sonic boom generated during atmospheric reentry. These effects are based on thresholds identified in literature regarding structural damage from sound pressure levels (Fenton and Methold 2016; National Academy of Sciences 1977) and overpressures (Haber et al. 1989). Sound lasting more than one second with levels exceeding 130 decibels (dB; unweighted) is potentially damaging to structures (Haber et al. 1989; National Academy of Sciences 1977). Considering effects of ground, launch, and landing operations associated with SSH, the operational APE was established as any area subjected to greater than or equal to 2 pounds per square foot (psf) from sonic booms under annual mean weather conditions for the range of launch/landing activities, an area that also encompasses the 130 dB threshold for launch effects. The APE totals 2,050,232.71 acres (ac); the majority of the

APE extends off the Cape Canaveral coast over the Atlantic Ocean, leaving 168,770.55 ac as terrestrial.

SEARCH completed an intensive architectural history survey and NRHP evaluation for 97 previously recorded resources outside of federal property, including 18 NRHP-listed resources or resource groups, 36 resources or resource groups previously determined eligible or "potentially eligible" by SHPO, and 43 resources without SHPO determinations that were previously recommended "NRHP eligible." SEARCH determined during survey that seven of these previously recorded resources are no longer extant (8BR00681, 8BR00759, 8BR00946, 8BR00953, 8BR01762, 8BR1763, and 8BR01764), and are therefore not eligible for NRHP inclusion. SEARCH recommends all 18 NRHP-listed resources or resource groups retain sufficient integrity to remain listed in the NRHP. SEARCH recommends that 64 previously recorded resources are eligible for NRHP inclusion, that one previously recorded resource is eligible as a resource group contributor (8BR00703), and that six previously recorded resources are not eligible for NRHP inclusion. Additionally, one previously recorded resource (8BR01812) remains unevaluated for NRHP eligibility due to a lack of survey access.

SEARCH completed an intensive architectural resource survey of 142 previously recorded resources outside of federal property that are within existing resource group boundaries, resources without determinations or recommendations, and cemeteries without determinations or recommendations. SEARCH determined during the survey that one resource (8BR02171/St. Mary's Church Rectory); and one resource group (8BR03345) are no longer extant, and are therefore not eligible for NRHP inclusion. SEARCH recommends that 122 resources are eligible as resource group contributors and that nine resources are eligible for NRHP inclusion. SEARCH recommends that six resources are ineligible for NRHP inclusion. Additionally, two previously recorded cemeteries (8BR01979 and 8BR03334) and one previously recorded resource group (8BR02143) remain unevaluated for NRHP eligible due to a lack of survey access.

SEARCH conducted a windshield survey outside of federal property to identify architectural styles, distinguishing characteristics, and general development patterns in areas with a high concentration of unrecorded resources to reasonably analyze the effects on notable characteristics, such as stained-glass windows and decorative woodwork, as a result of the SSH launch and landing activities. Areas of concentration in Titusville North, Titusville South, and Merritt island were identified to characterize architectural styles, distinguishing characteristics, integrity, and inform interpretations about development patterns.

SEARCH completed an archaeological desktop analysis of the 355 archaeological resources recorded in the FMSF within the operational APE. Of these resources, 93 are eligible for NRHP listing, are potentially eligible, or have not been evaluated by the SHPO and are recorded as site types that have the potential to contain above-ground or landscape features, or potentially contain human remains. According to the Florida Master Site File, 33 of the sites potentially contain human remains. There are 15 sites with the potential to retain above-ground components that may contribute to the sites' NRHP eligibility.

Within the construction APE, LC-39A is well documented, and no further identification or evaluation of LC-39A is proposed. Furthermore, it is anticipated that proposed new construction associated with the operation of the SSH will be compatible with the characteristics of other launch-complex infrastructure and will not pose viewshed effects to historic properties.

Within the operational APE, SEARCH recommends that adverse effects resulting from SSH launch and landing activities are not likely but are possible. Though unlikely, vibratory and sonic-boom events could result in the potential for window breakage, damage to character-defining plaster and masonry features, and structural damage to highly vulnerable or poorly maintained buildings. Although it is similarly unlikely—because the nature of longitudinal effects of vibratory and overpressure events on archaeological sites has not been studied thoroughly—adverse effects to such resources cannot be ruled out. The majority of documented resources outside of NASA KSC and CCSFS are within the 2 psf overpressure contour. However, resources located on KSC and CCSFS are within the 20, 10, 6, and 4 psf contours. Resources subjected to higher overpressure resulting from sonic booms may be more susceptible to adverse effects. Because a final determination of how the undertaking will affect historic properties is not possible at this time, the development of a programmatic agreement to monitor for and mitigate potential adverse effects is recommended.

Finally, SEARCH makes several recommendations for the development of Programmatic Agreement stipulations based on feedback received from earlier drafts of this report. These include additional efforts to identify and evaluate historic properties not discussed in this report, monitoring historic properties within different psf contours for effects resulting from spacecraft launches and landings, and monitoring sonic boom overpressure and vibration at archaeological sites.

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1 INTRODUCTION

This report presents the results of an architectural history survey and archaeological desktop analysis conducted on behalf of Leidos and SpaceX in support of an environmental impact statement (EIS) evaluating the potential impacts of proposed infrastructure construction and ground, launch, and reentry operations associated with the SpaceX Starship Super Heavy (SSH) launch vehicle at LC-39A, National Aeronautics and Space Administration Kennedy Space Center (NASA KSC), Brevard County, Florida (**Figure 1-1**).

SpaceX proposes using Launch Complex 39A (LC-39A) to support SSH operations at NASA KSC. Proposed operations include construction of a launchpad and other launch-support infrastructure at LC-39A, launching the SSH at LC-39A, landing the Starship and the Super Heavy Booster at LC-39A, landing the Super Heavy Booster and Starship on droneships in the Atlantic Ocean, expending the vehicles and components in the ocean, or landing and recovering Starship from the ocean as a contingency. For operations at LC-39A, SpaceX must obtain a Vehicle Operator License from the Federal Aviation Administration (FAA). Issuance of this license constitutes an undertaking under Section 106 of the National Historic Preservation Act of 1966 (NHPA). Similarly, NASA KSC has determined the associated activities at LC-39A constitute an undertaking requiring compliance with Section 106. The FAA is the lead Federal Agency for the National Environmental Policy Act of 1969 (NEPA) review and is responsible for the development of the EIS. NASA KSC is acting as the lead federal agency for compliance with Section 106 of the NHPA. As such, Section 106 will be conducted pursuant to the 2009 *Programmatic Agreement Among the National Aeronautics and Space Administration, John F. Kennedy Space Center, Advisory Council on Historic Preservation, and the Florida State Historic Preservation Officer: Regarding Management of Historic Properties at the Kennedy Space Center,* or any subsequent version thereof.

Southeastern Archaeological Research LLC (SEARCH) completed this study to comply with Public Law 113-287 (Title 54 U.S.C.), which incorporates the provisions of the National Historic Preservation Act of 1966, as amended (NHPA), in compliance with the regulations implementing Section 106 of the NHPA (Code of Federal Regulations [CFR] Title 36, Part 800), and in accordance with Florida Administrative Code, Chapter 1A-46. The approach for the identification of historic properties in this report was developed in consultation with NASA KSC, the FAA, and the Florida State Historic Preservation Officer (SHPO). The report presents the results of background research, desktop-level review of previously recorded historic properties (architectural history and archaeological resources), intensive architectural history field survey of historic properties, and windshield architectural history survey.

The research design was developed in consultation with NASA KSC, the FAA, and the Florida State Historic Preservation Officer (SHPO) to make a good-faith effort to identify NRHP-eligible, potentially eligible, and unevaluated properties possessing character-defining features that could reasonably be expected to incur adverse effects from episodic and longitudinal exposure to auditory, vibratory, and sonic-boom overpressure events caused by SSH launch and reentry activities. The approach was discussed with and presented in a technical report to the Florida

SHPO, who concurred with the approach in a meeting on January 23, 2025. Additionally, this identification and evaluation approach is aligned with standard FAA practice for compliance with Section 106 of the NHPA and its implementing regulations and is consistent with Chapter 8 of the FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (FAA 2015).

The architectural history survey efforts included an intensive architectural survey and a windshield survey outside of federal property. Prior to conducting the survey, an architectural history desktop review was conducted including research in the FMSF, previously recorded cultural resource surveys documented with KSC after 2001, Integrated Cultural Resources Management Plans (ICRMP) for NASA KSC and CCSFS, and review of historic maps and aerial photography. In total, 1,583 previously recorded historic resources located outside federal lands or federally owned parcels; and nine historic age bridges are documented in the FMSF within the APE.

SEARCH completed an intensive architectural history survey and NRHP evaluation off federal property for 96 previously recorded resources, including 18 NRHP-listed resources or resource groups, 35 resources or resource groups previously determined eligible or "potentially eligible" by SHPO, and 43 resources without SHPO determinations that were previously recommended "NRHP eligible." SEARCH determined during survey that seven of these previously recorded resources are no longer extant (8BR00681, 8BR00759, 8BR00946, 8BR00953, 8BR01762, 8BR1763, and 8BR01764), and are therefore not eligible for NRHP inclusion. SEARCH recommends all 18 NRHP-listed resources or resource groups retain sufficient integrity to remain listed in the NRHP. SEARCH recommends that 63 previously recorded resources are eligible for NRHP inclusion, that one previously recorded resource is eligible as a resource group contributor (8BR00703), and that six previously recorded resources are not eligible for NRHP inclusion. Additionally, one previously recorded resource (8BR01812) remains unevaluated for NRHP eligibility due to a lack of survey access.

SEARCH completed an intensive architectural resource survey off federal property of 142 previously recorded resources that are within existing resource group boundaries, resources, without determinations or recommendations, and cemeteries without determinations or recommendations. SEARCH determined during the survey that one resource (8BR02171/St. Mary's Church Rectory); and one resource group (8BR03345) are no longer extant, and are therefore not eligible for NRHP inclusion. SEARCH recommends that 122 resources are eligible as resource group contributors and that nine resources are eligible for NRHP inclusion. SEARCH recommends that six resources are ineligible for NRHP inclusion. Additionally, two previously recorded cemeteries (8BR01979 and 8BR03334) and one previously recorded resource group (8BR02143) remain unevaluated for NRHP eligible due to a lack of survey access.

SEARCH conducted a windshield survey off federal property to identify architectural styles, distinguishing characteristics, and general development patterns in areas with a high concentration of unrecorded resources to reasonably analyze the effects on notable characteristics, such as stained-glass windows and decorative woodwork, as a result of the SSH launch and landing activities. Areas of concentration in Titusville North, Titusville South, and

Merritt Island were identified to characterize architectural styles, distinguishing characteristics, integrity, and inform interpretations about development patterns.

SEARCH conducted a desktop analysis of archaeological sites within the APEs that included a review of the FMSF database and modern aerial photographs to identify archaeological sites that have the potential for aboveground components that may contribute to NRHP eligibility, including all sites that may contain human remains. There are 355 sites recorded on the FMSF database within the operational APE. In total, 15 archaeological sites were identified as having the potential to retain aboveground components that may contribute to the site's NRHP eligibility. According to the FMSF, 33 of the sites potentially contain human remains.

The principal investigator for this project exceeds the *Secretary of the Interior's Standards and Guidelines for Archaeology* (48 FR 44716 [SOI Standards]). The report was written by Kate Willis, MPS; Angelique Theriot, MA; Alexis Thomas, MPS, MS; Ashley Parham, PhD; and Leeanne Mahoney, MPS. The fieldwork was conducted by Kate Willis, MPS; Angelique Theriot, MA; Alexis Thomas, MPS, MS; Ashley Parham, PhD; Mary Bonatakis, BA; and Shelby Foy, BA. Ms. Willis and Ms. Theriot exceed the SOI Standards for Architectural History, and Ms. Mahoney exceeds the SOI Standards for Archaeology. Angelica Costa, BA, produced field maps and report figures. Charles Sterchi, MFA, produced the document.

1.1 AREA OF POTENTIAL EFFECTS

The area of potential effects (APE) is defined as the "geographic area or areas with which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 Code of Federal Regulations 800.16[d]). As such, the APE has been developed to consider both a construction APE and an operational APE.

The construction APE is limited within the previously disturbed and existing boundaries of LC-39A. The proposed new construction is anticipated to be compatible with the characteristics of other launch complex infrastructure and will not pose viewshed effects to historic properties. The operational APE considers the auditory, vibratory, and sonic boom overpressure effects of the SSH launch and reentry activities covered under the FAA operating license. For launch operations, the FAA has typically selected a noise contour for a specific propulsion/engine noise level and/or a specific sonic boom/overpressure, because rocket noise has the greatest geographical extent of all the potential sources of alterations to historic properties from launches (including landings and reentries). Auditory, vibratory, and sonic boom overpressure effects are based on thresholds identified in literature regarding structural damage from sound pressure levels (Fenton and Methold 2016; National Academy of Sciences 1977) and overpressures (Haber et al. 1989).

Vibratory impacts can be quantified using the Maximum Unweighted Sound Level (Lmax) (Bradley et al. 2020:3). Impacts from sonic-boom overpressure are quantified in psf. Studies have shown that damage from sonic-booms is highly unlikely when structures are exposed to levels under 2 psf (Haber et al. 1989). However, when exposed to levels between 2 and 4 psf, structural

components, including glass and plaster, demonstrate damage at a higher rate than expected due to natural wear in well-maintained structures (Haber et al. 1989). The National Academy of Sciences' "Guidelines for Preparing Environmental Impact Statements on Noise" (National Academy of Sciences 1977) state that one may conservatively consider all sound lasting more than one second with levels exceeding 130 dB (unweighted) as potentially damaging to structures.

Based on this information and previous research regarding rocket engine noise and vibration effects to structures, the operational APE was established as any area subjected to overpressure levels greater than or equal to 2 psf associated with sonic booms under annual mean weather conditions for the range of launch/landing activities, which encircles a smaller area, focal to the launch pad, associated with greater than or equal to 130 dB (**Figure 1-1** and **Figure 1-2**) (Fenton and Methold 2016, Guest and Slone 1972, Haber et al. 1989). The APE is 2,050,232.71 acres (ac), mostly extending off the Cape Canaveral coast over the Atlantic Ocean, leaving 168,770.55 ac of the APE as terrestrial.

1.2 REPORT ORGANIZATION

The report introduction and description of the APE is presented in **Section 1**. The APE location and Environment is described in **Section 2**. Regional historic context including Native American culture history and postcontact history is synthesized in **Section 3**. The background research, including review of relevant state and local resources, and historic maps and aerial photography is discussed in **Section 4**. The research design and methods employed for the survey are described in **Section 5**. The results are described and discussed in **Section 6**. Conclusion and recommendations are in **Section 7** and the references used for the report can be found in **Section 8**. The following appendices compliment the main report content and provide more detailed information**; Appendix A:** Previously Recorded Cultural Resources at NASA KSC and CCSFS, **Appendix B**: Historic Maps and Aerial Photographs, **Appendix C**: Intensive Architectural History Survey Results Figures: Resources Determined NRHP Eligible or Potentially Eligible by SHPO or Recommended NRHP Eligible or Potentially Eligible without SHPO determinations, **Appendix D**: Intensive Architectural History Survey Results Figures: Resources Within Existing Resource Group Boundaries, Those Without Determinations or Recommendations, and Cemeteries Without Determinations or Recommendations, and **Appendix E**: Previously Recorded Archaeological Resources.

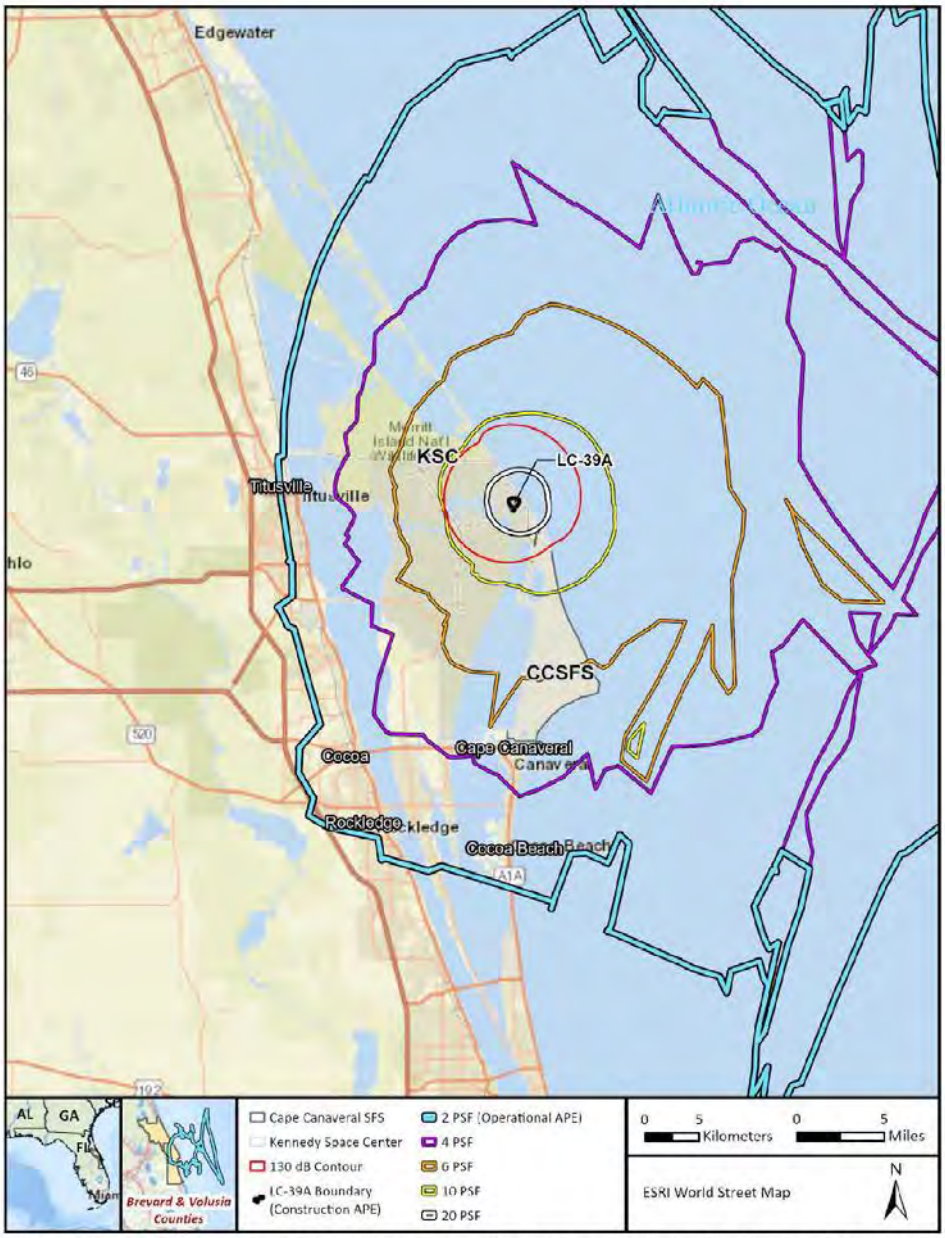

Figure 1-1. Location of the construction and operational APE, showing contours for 130 dB Lmax and 2 psf sonic boom overpressure.

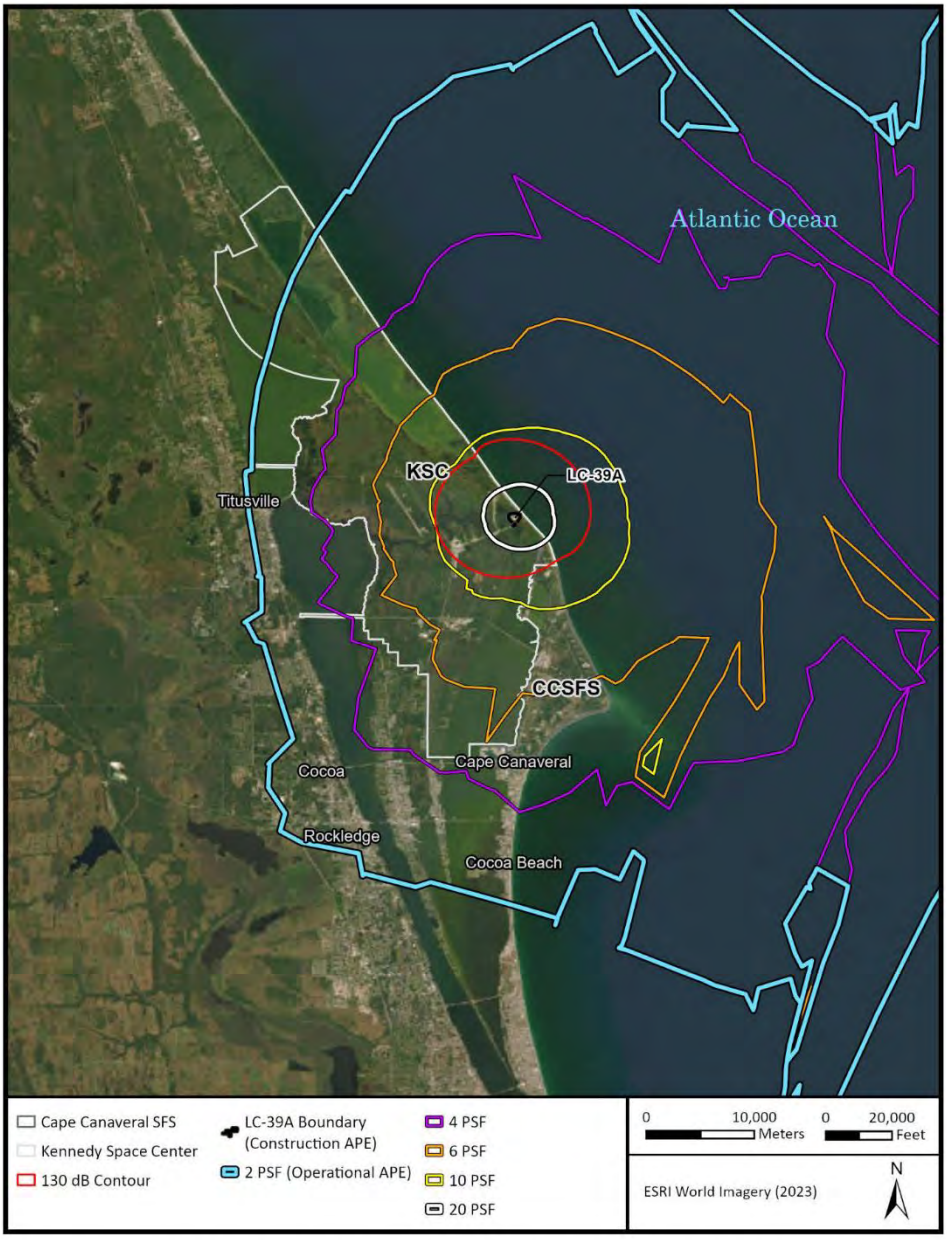

Figure 1-2. Location of the construction and operational APE, showing contours for 130 dB Lmax and 2 psf sonic boom overpressure on an aerial photograph.

2 LOCATION AND ENVIRONMENT

This section presents a description of the location and modern condition of the APE and a review of the natural environment physiography, geology, and paleoenvironment that assisted in the development of appropriate survey methods. These data also contribute to understanding land use and regional settlement patterns to facilitate the survey results interpretations.

2.1 LOCATION AND MODERN CONDITIONS

The operational APE surrounds LC-39A and includes NASA KSC and Cape Canaveral Space Force Station (CCSFS) in Brevard County. From LC-39A, the boundary expands west approximately 19 miles (mi) over Cape Canaveral, North Merritt Island, and the Banana and Indian Rivers, and inland Florida, east approximately 60 mi from the Cape Canaveral coast over the Atlantic Ocean, north approximately 45 mi off the northeastern coast of Cape Canaveral, and south approximately 54 mi over Cape Canaveral and Merritt Island.

The operational APE totals 2,050,232.71 ac, the majority of which is over the Atlantic Ocean. The inland portion intersects densely populated and developed municipal districts such as Titusville, Cocoa, and Cape Canaveral, residential areas, industrial areas, and rural and undeveloped areas. Undeveloped areas are characterized by dune, hammock, and lagoon habitat, and are mostly on Merritt Island between the Banana and Indian Rivers.

2.2 PHYSIOGRAPHY AND GEOLOGY

The operational APE is centered in the Cape Canaveral physiographic province within the larger Eastern Flatwoods District, as defined by Brooks (1981). The area is characterized by an accreted series of coastal ridges over coquina and sand shell from the Middle and Late Pleistocene and by excessively drained dunes and ridges on coastal plain marine terraces (Brooks 1981). The geological formations within the APE include Pleistocene and Holocene beach ridge and dune sand along the Cape Canaveral coast, Quaternary Holocene sediments on Cape Canaveral and Merritt Island and Pleistocene Anatasia Formation and shelly sediments of Plio-Pleistocene age on the mainland Florida coast (Florida Geological Survey 2001).

2.3 PALEOENVIRONMENT

Approximately 24,000 to 18,000 years ago, during the Last Glacial Maximum, global ice volumes were at their greatest, and temperatures were about 11˚F colder than they are today (Ehlers and Gibbard 2004). However, this period was also characterized by a slow warming trend that melted massive ice sheets and resulted in global sea-level rise (Rohling et al. 1998). At 22,000 calibrated years before present (cal BP) (20,050 BC), Gulf of Mexico sea levels were at a low stand of 125.0 to 130.0 m (410.1 to 426.5 ft) below modern levels (Joy 2019:109), and Pleistocene shorelines

extended at least 200 km (124 mi) further south than today's (Balsillie and Donoghue 2004; Gagliano et al. 1982; Saucier 1994:49–50).

After about 17,000 cal BP (15,050 BC), global melting of the ice sheets (deglaciation) led to sea-level rise and transgression of the continental shelves, particularly Florida's western margins that drain the Floridan aquifer-fed rivers. Even during the Younger Dryas, the last return to glacial conditions about 13,800 cal BP (11,850 BC), meltwaters slowed, but sea level continued to rise at least 60.0 m (196.9 ft) over the next 2,400 years (Joy 2019). Sea levels, though higher, were still much lower than at present; along the Gulf Coast, extensive grasslands probably existed, possibly attracting mammoth, bison, and other large grazing mammals.

The rate of sea-level rise was generally slow for 13,000 years to about 4500 cal BP (2550 BC); however, the rate and magnitude of ice melt was punctuated by three "melt-water pulses" that occurred in the late Pleistocene and early Holocene at approximately 14,200, 11,400, and 8000 cal BP (12,250, 9450, and 6050 BC) (Blanchon 2011). Florida's wetlands, lakes, and ponds formed mostly after 9000 cal BP (7050 BC) (Watts and Hansen 1988). By 6000 cal BP (4050 BC), Florida's climate included increased precipitation and surface water flow, as indicated by increased pine and wetland pollens, including abundant cypress, which indicates broad new areas of wetland habitat in the later pollen records (Watts and Hansen 1988; Watts et al. 1992). Higher sea levels and elevated water tables resulted in essentially modern conditions by the late Holocene, approximately 4500 cal BP (2550 BC). The climate, water levels, and plant communities of Florida have been relatively stable during the past 4,000 years.

3 HISTORIC CONTEXT

This section presents the cultural context for eastern Florida including a Native American culture history and a historical summary of Brevard County. The precontact Native American culture history consists of a three-part chronology, with each period based on distinct cultural and technological characteristics recognized by archaeologists. The three temporal periods that predate the written record are Paleoindian, Archaic, and Post-Archaic. The historical summary of Brevard County reviews the early European exploration and settlement in the region beginning in the sixteenth century, the establishment of Brevard County in the nineteenth century, and the major events of the twentieth century.

3.1 Native American Culture History

3.1.1 Paleoindian Period, 10,000–8,000 BC

The most widely accepted model for the peopling of North and South America is that Asian populations migrated to North America over the Beringia land bridge that formerly linked Siberia and Alaska some 12,000 years ago (Smith 1986). However, archaeological data are mounting in support of migrations that date to before 12,000 years ago (Adovasio et al. 1990; Dillehay et al. 2008). Regardless of the precise timing of the first occupations of North and South America, the current evidence suggests that Florida was not intensively inhabited by humans prior to about 12,000 years ago. Claims for an earlier occupation (e.g., Purdy 1981, 2008) are controversial. The best evidence comes from the Sloth Hole and Page-Ladson sites in Jefferson County, where radiocarbon dates predating 10,000 BC have been obtained from levels containing lithic waste flakes, but no diagnostic tool forms (Dunbar 2002, 2006; Hemmings 1999, 2004). Both sites are inundated river sites, and although the contexts are thought to be intact, there is a possibility of the downward movement of artifacts from the overlying artifact-bearing levels.

The conventional view of Paleoindian existence in Florida has been that people were nomadic hunters and gatherers within an environment quite different from that of the present. Excavations at the Harney Flats site in Hillsborough County (Daniel and Wisenbaker 1987) have altered this view, and many archaeologists now believe that people during the Paleoindian period lived part of the year in habitation sites near critical resources, such as fresh water.

3.1.2 Archaic Period, 8,000–500 BC

During the subsequent Archaic period (8,000–500 BC), human populations began to expand outward from north-central Florida as the climate became wetter and water sources more prevalent. After the demise of Pleistocene fauna, human subsistence strategies became more diverse and included new plant, animal, and aquatic species. People began to live in larger groups, use different types of stone tools, and inhabit more of what is now Florida.

The Early Archaic (8000–5000 BC) represented a continuity of the Paleoindian occupation of Florida and occurred during a time of rising sea levels, a gradual warming trend, and the spread

of oak hardwood forests and hammocks. Numerous small Early Archaic special activity and camp sites have been identified throughout the East Central Florida region (Milanich 1994). The Middle Archaic (5000–3000 BC) was a wetter period, with the intrusion of mixed pine and oak into the hardwood forest. As conditions became wetter, large river systems and wetlands developed, and people began to exploit the resources associated with these aquatic habitats. This trend continued into the Late Archaic period (3000–500 BC); however, there is evidence that the environment became slightly drier during this period and that aquatic habitats were fewer and not as deep (Russo 1986). Precontact populations in Brevard County were probably much smaller than in more productive locales along the lower St. Johns River.

The earliest pottery was tempered with plant fibers. The people who made fiber-tempered pottery practiced a lifestyle of hunting, gathering, and incipient horticulture. One of the centers of early pottery production was along the Atlantic Coast between southern South Carolina and northern Florida. Fiber-tempered pottery was made with naturally occurring clays; plant fibers were added to the clay as a tempering agent to strengthen it. Traditionally, manufacture of this ware was believed to span approximately 1,500 years, with plain and decorated variants (e.g., incised and punctated types) undergoing periods of stylistic popularity (Bullen 1972). Radiometric analysis, however, suggests that the production of fiber-tempered wares, at least in the Middle St. Johns River Valley, spanned a shorter interval from about 2100–1600 BC (Randall and Sassaman 2005) with stylistic variability attributable to ethnic, sociopolitical, and functional factors more than to temporal trajectory (Sassaman 2003).

3.1.3 Post-Archaic Period, 500 BC–AD 1565

By 500 BC, regional adaptations were well established. Archaeologists subdivided the state into geographic areas that share similar archaeological traits. The APE is within the Indian River region of the East and Central Lake archaeological region. The Indian River region extends from the Indian River–St. Lucie County line northward along the Atlantic coast to Merritt Island in Brevard County (Milanich 1994; Rouse 1951). The western boundary extends about 32 km (20 mi) inland to the St. Johns River drainage and tributaries.

Irving Rouse (1951) first described archaeological cultures in the Indian River area as Malabar. His chronology framed Malabar as a local variant of the St. Johns tradition, which grew out of the Orange pottery of the Late Archaic period. Mostly known from sites in its core area of northeast Florida, the St. Johns tradition is characterized by chalky pottery first produced beginning about 500 BC. Increased population and settlement numbers, construction of sand burial mounds, continued economic dependence on aquatic resources, and greater emphasis on plant cultivation accompanied the changed ceramic production (Goggin 1952:40; Milanich 1994:243-274). Significant amounts of sand-tempered pottery also characterize Indian River pottery assemblages. This pottery may indicate influence from adjacent culture areas. Some vessels were likely made from the same local clays as the St. Johns wares (Espenshade 1983).

Table 3-1 presents the post-Archaic ceramic chronology of the Indian River region. Cordell's (1985) analysis of pottery from several sites in Brevard County largely informs the sequence. The sequence appears to be applicable to other portions of the Indian River region as well (Milanich

1994:250). Dates assigned to these periods are estimates extrapolated from Milanich's chronology for the entire East and Central Lakes archaeological region (Milanich 1994:247).

Table 3-1. Post-Archaic Ceramic Chronologies in the Indian River Region.

Years	Period	Distinguishing Traits
ca.AD 1500–1565	Period III	Introduction of European artifacts. St. Johns Check Stamped continues.
ca. AD 750–1500	Period II	St. Johns Check Stamped appears in combination with St. Johns Plain. Sand-tempered plain remains at about 10 percent. Belle Glade Plain remains a minority type.
ca. AD 500–750	Late Period I	St. Johns Plain returns to dominance as sand-tempered plain decreases to about 10 percent. Slight increase in Belle Glade Plain (3 percent).
ca. AD 0–500	Middle Period I	St. Johns Plain is still predominant, but sand-tempered plain increases to about 30 to 40 percent of assemblages. Belle Glade Plain present in very small amounts (less than 1 percent).
ca. 500 BC – AD 0	Early Period I	Decrease in fiber-tempered pottery. St. Johns Plain is the dominant ware. Minor representation of sand-tempered plain.

Sources: Carr et al. 1995; Cordell 1985; Milanich 1994

In the above table, Malabar I corresponds to the Early Period and into Period II. Malabar II is characterized by the appearance of St. Johns Check Stamped pottery, beginning in Period II, and continuing through Period III (Milanich 1994:250; Rouse 1951). The Indian River region was not widely influenced by Mississippian culture. Some exotic goods have been identified in Malabar II contexts, but they are sparse and infrequent (Penders 2012). Interaction was more frequent between coastal groups and interior groups of the Indian River region. Most sites recorded in Cape Canaveral are along the Banana River.

Interior sites include small, special-use campsites and larger, multicomponent sites featuring extensive midden deposits that may indicate permanent habitation. Russo's (1986) analysis of faunal remains from interior sites denotes a dependence on aquatic resources, including turtles, waterfowl, fish, and freshwater mussels. Throughout the post-Archaic period, wetland resources expanded. Water sources deepened, providing suitable habitats for more and larger fish, such as bass and pickerel. During the dry months (winter and spring), water sources shrank and provided habitat for fish species, such as bowfin and gar, that favor shallow, muddy-bottomed ponds. Terrestrial animals, including deer, raccoon, and rabbit, also were exploited. Dietary emphasis was definitively on freshwater wetland resource acquisition.

Coastal sites were present in many locations along the Indian River lagoon, the adjacent uplands, and on the barrier islands. Although modern development destroyed many of these sites, a few have been investigated and provided information on coastal adaptations. Evidence suggests that the coast was utilized seasonally during the winter and spring months of the year when interior wetlands were less abundant. The data indicates that some sites were small, extractive sites occupied by only a few individuals, while other larger sites served as habitation sites. People exploited marine fish, shellfish (especially coquina), and some terrestrial animals for food (Milanich 1994:252-253). Coastal and interior sites occupation is unclear. The same people may have occupied both locations during different parts of the year, or different groups may have occupied each area year-round.

Mortuary practices intensified in the Malabar I and II periods. Shell and sand mounds were commonly built in the Indian River region but are not easy to differentiate between Malabar I or Malabar II periods (Rouse 1951; Penders 2012). At Cape Canaveral, mounds are located adjacent or in proximity to habitation areas, unlike other areas of Florida where mounds are positioned away from associated occupation sites (Penders 2012).

3.2 POSTCONTACT HISTORY

3.2.1 European Exploration and Early Settlement, 1513–1821

The area that is now Brevard County served as an important stage for many early European expeditions in North America. Some historians believe that the Italian captain John Cabot sailed south along the Brevard County coast during his 1498 explorations (Dovell 1952; Eriksen 1994). There is also evidence that Spanish ships raided indigenous coastal villages to capture and enslave people. When Juan Ponce de León came to Florida, he found a local who understood Spanish. Ponce de León left Puerto Rico on March 3, 1513, with three ships. After sailing on a northwesterly course for 30 days, the ships landed either north of Cape Canaveral or in the vicinity of modern-day Melbourne Beach (Eriksen 1994, Gannon 1996, Milanich 1995). Ponce de León sighted land during the Feast of Flowers (Pascua Florida) and called it La Florida (Milanich 1995). Ponce de León remained at this initial landing place for six days before pulling anchor and sailing toward Jupiter Inlet, where he landed to restock firewood and water for the ships. The fleet rode the countercurrents of the Gulf Stream to Biscayne Bay and eventually rounded the southern tip of the peninsula (Gannon 1996; Milanich 1995). The Spanish called the island off the Brevard County coast Canaveral, the Spanish term for canebrake. Many sixteenth century maps depict the Cape, and it is one of the oldest place names in North America (Eriksen 1994).

The Gulf Stream located off the Brevard County coast became an important thoroughfare for the transportation of New World supplies to Europe. Spanish treasure galleons rode this warm current from Havana through the Bahama Channel. Though wrecks were common in the treacherous shoals around Cape Canaveral, the Spanish crown realized the importance of this trade route. When they learned that the French were developing a colony, Fort Caroline, on the St. Johns River near modern-day Jacksonville, the Spanish crown tasked Pedro Menéndez de Avilés with eradicating the French influence in the area and starting a colony in La Florida (Milanich 1995). The French colony awaited supplies and reinforcements coming from France under the command of Jean Ribault. Menéndez felt it crucial to reach and destroy Fort Caroline before Ribault arrived. In August 1565, Menéndez, with his fleet of 10 ships, sighted Cape Canaveral (Gannon 1996; Milanich 1995). The Spanish force searched for six weeks along the northern Florida coast before they found the French fort. A tropical storm had scattered the French defenses and left the fort an easy target for Menéndez to destroy. During the gale, a ship of French colonists had wrecked somewhere near Cape Canaveral. While Menéndez marched south along the coast to meet the wayward French force, he kept a detailed description of the area, including Brevard County. The Spanish constructed the garrison Santa Lucia on the high plateau near Jupiter Inlet as a line of defense for the new colony (Eriksen 1994; Milanich 1995).

In 1605, the Spanish sent a delegation under the command of Álvaro Mexía to the Brevard County area. Spanish officials charged the diplomat with placating the Ais Native Americans and mapping the region. His mission proved successful and Mexía became an honorary chief of the tribe. He went on to explore and record the Indian and Banana Rivers (which the Spanish called Rio de Ais and Ulumay Lagoon). Mexía's maps detail many Native American settlements along the shores of Mosquito Lagoon at the north end of the Banana River. It is possible that his entourage spread orange seeds along the banks of the Indian River (Eriksen 1994).

On July 24, 1715, a flotilla of 11 Spanish ships carrying 14 million pesos in gold, silver, and jewels left Havana for Europe. A few days into the voyage, 10 of the 11 ships wrecked off the East Florida coast between the St. Lucie and Matanzas Inlets. Approximately 700 sailors died, and an additional 1,500 washed up on the coast. The Ais aided the Spaniards by providing them with supplies and instructions for gathering food in the dunes. The Spanish government, desperate to recover the lost treasure, established an encampment of salvers in the vicinity of the present-day Sebastian State Park in the far southern portion of Brevard County. Salvers recovered only one-third of the lost cargo (Eriksen 1994).

In the mid-1700s, European colonial powers fought the far-reaching Seven Years War to consolidate their colonial holdings. After the British victory in the Seven Years War in 1763, they traded their Havana conquest to Spain for Florida. The British divided the colony along the Apalachicola River into East and West Florida. In 1765, the botanist John Bartram and his son William searched for the St. Johns River headwaters (Eriksen 1994; Tebeau 1980). The two became the first Europeans to document the Brevard County region (Eriksen 1994). In 1783, the Treaty of Paris restored Florida to Spain, whose control of the territory remained tenuous (Tebeau 1980). Vicente Manuel de Zéspedes, the Spanish governor, wrote to the king in 1785 that isolated groups of Americans had settled in the area (Eriksen 1994; Tebeau 1980). Immigrants from the Native American tribes north of Florida now numbered 5,000 to 6,000 in the colony. The majority of these "Seminoles" remained west of the St. Johns River. The area known as the Mosquito Coast included present-day Brevard County (Eriksen 1994).

During the Second Spanish occupation of Florida, the government granted land to individuals to encourage settlement of the colony or as compensation for services performed. As Spain and the US entered negotiations for the transfer of Florida, the Spanish government began transferring large tracts of land to individuals (Shofner 1995:31). Spain believed these grants kept substantial portions of the colony in Spanish hands once the US took control of Florida. Only seven grants were issued in present-day Brevard County (Shofner 1995:31). The largest in the present-day county belonged to Joseph Delespine, who had previously served as the king's personal physician. Delespine received a 43,000-acre grant between Titusville and Cocoa (Nabors 1967; Works Progress Administration 1941:14-17). Spanish governor José María Coppinger granted the land to Delespine for his service during the Patriot War in 1812 (US Board of Land Commissioners 1828).

3.2.2 American Territorial Period through the Civil War, 1821–1861

Florida became a territorial possession of the US after President James Monroe ratified the Adams-Onís Treaty on February 22, 1821. Monroe appointed General Andrew Jackson governor of the territory later that same year (Eriksen 1994; Tebeau 1980). Jackson partitioned Florida into two counties, Escambia to the west and St. Johns to the east. In 1824, the area encompassing most of east-central Florida, including Brevard County, became Mosquito County. Colonel James Gadsden led a survey party through the eastern portion of the county in 1825 to find a route for a road from St. Augustine to what is now Dade County (Eriksen 1994; Fernald and Purdum 1992). Close to four million acres of the interior of the state served as a reservation for the Seminoles, including the southwestern corner of modern-day Brevard County (Mahon 1985).

On Christmas Day 1835, the Second Seminole War brought conflict to East Florida when Native American forces razed Mosquito Lagoon plantations. Along with a severe freeze in 1835, the war decimated Mosquito County's population, as most everyone fled to safe havens outside the county (Shofner 1995:36). The military erected forts throughout the Brevard area. Six hundred mounted militiamen, under General Joseph Hernandez's command, constructed Fort Ann 1.6 km (1.0 mi) south of modern-day Haulover Canal. He also erected Camp Hernandez south of present-day Scottsmoor in northern Brevard County. General Hernandez collected his troops at the camps on January 3, 1838, and proceeded to advance south along the eastern coast. Their path followed the high ground along the western side of the Indian River Lagoon before swinging west to meet Fort Taylor on Lake Winder, then angling southeast on a course parallel to what is now Interstate 95 (Eriksen 1994:38-39). The war ended in 1842, and on March 14, 1844, the territorial government created Saint Lucie County (present-day Brevard County) from Mosquito County (present-day Orange County) (Carter 1962:994-995; Dunn 1998:34).

On March 3, 1845, Florida became the twenty-seventh state admitted to the Union (Eriksen 1994). Judge Theodore Washington Brevard settled in Tallahassee two years later. He spent 12 years as state comptroller and was chosen as the county namesake on January 6, 1855, when St. Lucie County became Brevard County. This new county encompassed more than 7,000 square miles and had its seat of government in the small town of Susannah, north of Fort Pierce (Eriksen 1994; Fernald and Purdum 1992; Morris 1995). In 1854, John Houston established Arlington, the first permanent US settlement in south Brevard County, on land fronting the Indian River and Elbow Creek (Eriksen 1994). Shortly thereafter, the community of Sand Point (present-day Titusville) had enough people to receive a post office. However, the post office closed and reopened several times (Bradbury and Hallock 1962:83).

On January 10, 1861, Florida seceded from the Union. Brevard County remained far removed from the battlefields to the north but still played an important role in the war. The settlers along the Indian River engaged in salt production for the Confederate Army, and the cattle range in western Brevard County supplied beef. Blockade runners frequently utilized the inlets and bays of the Indian River and Mosquito Lagoon during their smuggling ventures (Tebeau 1980).

3.2.3 Late Nineteenth Century, 1861–1899

In 1867, Confederate Colonel Henry Theodore Titus arrived in the community of Sand Point with the intention of building a town on land owned by his wife, Mary. Once there, he and his wife built a hotel and called it "Titus House" (Titusville, Florida 2022). The Colonel and Mrs. Titus donated land for the first courthouse and four different churches. They guided planning the first streets and establishing a wagon link to the St. Johns and Indian Rivers. Eventually the name of Sand Point changed after Colonel Titus beat Captain Clark Rice at a game of dominoes to determine the settlement's new name (Titusville, Florida 2022). During this time other, smaller communities emerged in present-day Brevard County. R. A. Gardner and Thomas Hardee moved to the Rockledge area in 1868 (Shofner 1995:85). Over the next eight years, enough new settlers joined them to establish a post office in 1876 (Bradbury and Hallock 1962:72; Shofner 1995:127). By 1880, 40 people called Rockledge home (Barbour 1964[1882]:37-38).

Before the 1880s, water transportation, both sea and river, remained the dominant mode of long-distance travel for most of Florida's residents. Settlements such as Hardeeville became stops for steamboats. The small town of Hardeeville operated a substantial steamboat wharf, daily mail service and passenger service (Graham 1891:49). Due to Florida's small population, underdevelopment, and lack of capital, railroad expansion in the state progressed slowly. By the mid-1800s, Florida claimed only one successful rail line, which connected Tallahassee to the Gulf of Mexico at St. Marks (Brown 1991:13-14). Most of Florida's roads remained slow, bumpy, waterlogged (during summer months), sand-laden trails that even ox teams had difficulty traversing. With the arrival of Henry Flagler and Henry Plant in the 1880s, trains began to cross the Florida landscape. Especially for communities in Florida's interior, trains provided a "rapid transit" of agricultural produce to the northern markets. While agriculture and other Florida products flowed north along the rails, tourist, immigrants, and goods traveled south in the new trains. Railroads brought growth to the communities and regions they touched (Covington 1957:136, 169; Johnson 1966:129).

In 1879, citizens elected Titusville as the permanent seat of government for Brevard County. The population of the Indian River area rapidly expanded due to the solid economic base of agriculture and recreational fishing. In 1880, Melbourne, founded by Richard W. Goode, obtained a post office. In 1885, Titusville became a stop on the Jacksonville, Tampa, and Key West Railway. Tourists in the 1880s traveled to Rockledge by a combination of rail and steamer (Henshall 1884:18; Hawkes 1887:94-95). Railroads dropped visitors off in Titusville where they boarded Indian River steamers that conveyed them to Rockledge (Barbour 1964[1882]:37). Stephen Ryder built Rockledge's first hotel, in 1878 (Shofner 1995:127). By 1886, Rockledge's population reached 200 and Cocoa had a population of 100 (Richards 1886:385; Webb 1886:202). With the growing tourist industry, towns began to grow. Rockledge incorporated in 1887, and Cocoa opened its first post office in 1884 and incorporated in 1895. By 1887, Cocoa had six stores and quickly expanded around its deep-water landing (Historic Cocoa Village 2021).

With the increase in population, a number of African American residents also arrived in Brevard County. In 1880, 84 African Americans resided in Brevard County. This including the first African American resident of Titusville, Andrew Gibson. Gibson arrived in 1876 and worked as a barber

and owned his own restaurant (Patterson and Hatcher-Gallop n.d.; Titusville Historic Preservation Board 2025). The African American community in Brevard County remained small during the 1880s. In Titusville, the community revolved around the Joynerville Subdivision near present-day Drummet Avenue. The number of African Americans increased with the construction of the railroad. Many within the African American communities in Brevard County found work in railroad construction or orange groves. African American pioneer William Henry Maxwell operated his own citrus grove (Hinder et al 2024). Like much of the state during this decade, orange growing provided a significant source of revenue for area farmers (Hawkes 1887:94). In 1895, two deep freeze events in close succession devastated Florida's citrus industry. The industry recovered within two years (Eriksen 1994).

3.2.4 Twentieth Century to Present, 1900–Present

At the end of the nineteenth century, Florida began a concerted effort in road development. With the proliferation of railroads, farmers, merchants, and others clamored for better roads to get goods and people to and from railroad depots. During the 1910s and 1920s, the number of automobiles in the state and nation exponentially increased, exerting more pressure on the government to develop roads. Before 1924, the state had only 1,204 km (748 mi) of hard-surfaced road. By 1928, this number grew to 2,556 km (1,588 mi) with an additional 95 km (59 mi) in the process of pavement (Jackson 1992; Kendrick 1964; Tebeau 1980). As car ownership increased and roads improved, train dominance diminished. Florida began paving its portion of US 1 (originally labeled State Road No. 4) during this era; when completed, US 1 stretched from Canada to the southern tip of Florida (Federal Writers' Project 1939; Frazer and Guthrie 1995; King 1992). In 1927, the State Road Department declared, "the net result of the year's work is that all the gaps [in US 1] have been closed and that there is a continuous paved road between the Georgia State line and Miami" (*Florida Highways* 1928:2).

Communities along or near the road encountered growth and additional tourism during the boom years due to the roadway (Shofner 1996). Cocoa, as well as Titusville, established "auto camps" to house these travelers (Shofner 1996:15). To entertain the tourists and to draw more into the area, Cocoa organized Orange Festivals touting the success of the region's citrus industry and the Racing Association organized a car race on Cocoa Beach (Shofner 1996:46). At the height of the Florida Land Boom, Cocoa's population reached 2,216 and Titusville had a population of 2,081 (State of Florida 1945:84). With continued population growth, commerce also increased, totaling nearly 150 businesses operating in Cocoa (R.L. Polk and Company 1925:156-158). Titusville had four hotels, one weekly newspaper, a theatre, and a Coca-Cola bottling company (R.L. Polk and Company 1925:1049-–1050). This period also brought the completion of a non-wooden courthouse in 1912, and its subsequent expansion in 1925 (Brevard County Historical Society 2016). During the height of the boom, oranges constituted Rockledge's primary industry with 40 orange growers, many of whom supplemented their income by working other jobs such as carpentry or operating a general store (R.L. Polk and Company 1925:787-788).

Brevard County undertook a massive internal improvements program during the first 20 years of the new century. In 1917, Brevard County achieved its modern-day dimensions when the southern portions of the county became St. Lucie and Okeechobee Counties, and the western

portion became Osceola County (Fernald and Purdum 1992). Municipal governments constructed water towers, sewage lines, and new roads. The county purchased a large trenching machine in 1911 and began to drain the floodplain east of the St. Johns to open land for new development. The land west of Cocoa and Rockledge was the location of various plans to drain existing swamps. The drained areas could become fertile land for crops and new areas for home building. Both the city councils of Cocoa and Rockledge agreed to cooperate to drain the land west of the cities. Hoping to take advantage of the land boom of the 1920s, private companies also began drainage projects. The Cocoa Drainage District, later renamed the Cocoa-Rockledge District, was one of the private endeavors (Evening Tribune 16 July 1925:1, 26 March 1925:1). The center of population in the county shifted from Titusville in the north to Eau Gallie, Cocoa, and Melbourne in the south. In 1920, 1,445 people lived in Cocoa, 1,361 in Titusville, and 453 in Rockledge (Andriot 1993:101; State of Florida 1945:86). By the mid-1920s, four bridges spanned the Indian River, and new towns were established along the beaches as a result of these bridges (Eriksen 1994).

After the stock market crash of 1929, the number of tourists visiting Brevard County drastically waned. This decline damaged the economy and bankrupted the government. The area received aid from the Civil Works Administration, which employed 800 people from December 1933 to March 1934 to repair roads and build schools. In 1935, the Works Progress Administration (WPA) replaced the Civil Works Administration. This agency constructed a new post office in Cocoa (DiBiase and Imberman 2018; Eriksen 1994). Despite the economic setbacks, Cocoa's population continued to rise, reaching 3,098 in 1940 (Cocoa, Florida 2021). Titusville's population also grew to 2,220 by 1940 (State of Florida 1945:85-86). In Brevard County, Harry T. Moore founded the Brevard County Chapter of the National Association for the Advancement of Colored People (NAACP). Moore worked at the African American School in Titusville where he taught ninth grade and eventually became the school's principal. Moore went on to establish the first state conference of the NAACP chapters in Florida and formed the Progressive Voters League of Florida. Moore traveled around Florida to register African American voters and voters registered by Moore eventually accounted for 31 percent of all eligible African American voters in Florida (Leon and Jewel Collins Museum of African American History and Culture n.d.).

Cape Canaveral and the islands off the coast had been primarily isolated until the construction of bridges connecting them to the mainland (Lethbridge 2021). However, even after the construction of bridges, they remained sparsely settled for several more decades (Hiller 2005). By 1936, only two settlements remained evident near Cape Canaveral: Canaveral and Artesia (Florida State Road Department [FSRD] 1936). At the dawn of World War II, roughly 100 people called Cape Canaveral home (Lethbridge 2021). As World War II approached, the military chose land south of Cocoa Beach to build the Banana River Naval Air Station (Eriksen 1994). In 1942, the Navy opened the Melbourne Naval Air Station. The bases became the epicenter of the economy. At war's end, both bases closed (Morris 1948; Stone 1988). At the end of the war, three bridges connected mainland Florida to the barrier islands. Bridges were in Titusville, Cocoa, and Melbourne; the Titusville and Cocoa bridges are in the APE. Banana River Naval Air Station (NAS) was deactivated in 1947 and reassigned to the Air Force in 1948. In 1949, the Air Force installed personnel at the former Banana River NAS (Evening Tribune, 27 January 1949:2). The *Cocoa*

Evening Tribune noted that the Air Force was looking to operate the site with a "complement of officers, enlisted men, and civilian workers" (Evening Tribune 6 January 1949:2). By January 27, the *Evening Tribune* reported that Congress provided $200 million dollars "devoted to proving grounds for guided missiles", and while specific locations were not identified, it caused a flood of applications submitted to the Banana River Air Station, even though the station reported no jobs were available; however, the article continues, noting that a force of about 50 civilian workers have been on site repairing buildings and clearing vegetation. Finally, the paper states that while no official announcement has been made, people in Cocoa know operations would resume and that "the Tribune has known for many months about the proposed plans but has kept the information from publication" as means to keep rumors at bay (Evening Tribune, 27 January 1949:2).

By April, news emerged that Banana River Air Station was one of two sites favored for the long-range missile program with the other in California (Evening Tribune, 7 April 1949:1). A month later, Banana River was announced as the United States headquarters for its guided missiles program with city officials of Rockledge and Cocoa stating the community "was ready to…establish housing or other public facilities to care for Armed Service personnel or civilians" (Evening Tribune, 5 May 1949:1). The Department of Defense approximated that 500 service men and 430 civilians would be working at the installation in the next year (Evening Tribune, 12 May 1949:1). Within three weeks, the station was renamed the Joint Long-Range Proving Ground and the Evening Tribune published facts provided by the Air Force. Notable details included:

- *The proposed acquisition of 12,000 acres on Cape Canaveral to be used as the launching area.*
- *Background of the long-range missile program from 1945 onwards.*
- *Cape Canaveral was officially recommended in 1947 due to location and the proximity of Banana River NAS infrastructure that could be adapted to the mission.*
- *Site studies were undertaken by the Air Force, civilian engineering firms, the USACE, Navy Bureau of Yards and Docks, Chemical Corps, and Signal Corps.*
- *Up to 100 test flights a year.*

President Harry S. Truman officially established the Joint Long Range Proving Ground at Cape Canaveral in 1949. The Banana River Naval Air Station became Patrick Air Force Base in 1950 and hosted experimental launches of hybrid rockets as a supporting base for Cape Canaveral. Future employment options as well as the anticipated housing and infrastructure needs were likely of high interest to those in the Cocoa-Melbourne-Titusville area. The article also included that the program planned for 250 enlisted men, 2500 enlisted personnel, and 1500 civilian employees. The article did not expand on the role of civilian firms and the number of employees needed to support the mission. Additionally, there was a need for low-income housing because the military did not provide housing allowances or quarters to those below the three highest enlisted grades; thus privates, corporals, and Air Force sergeants were required to find housing for them (and if they had them, their families) in the local, private market (Evening Tribune, 16 February 1950:1). The *Evening Tribune* provided a view to the future writing "the joint long-range missile proving

ground will remain a major permanent testing facility for the armed forces of the United States" (Evening Tribune, 2 June 1949:2).

The strain on the local housing market was identified quickly after the announcement of the JLRPG. In response to the anticipated future housing need, Cocoa Mayor Noah C. Butt, established the Cocoa Housing Authority in late June. One of the five members was Al H. Trafford, a local realtor that would eventually be the listing agent for many of the subdivisions built in Cocoa (Evening Tribune, 23 June 1949:1). By October, Crispin's Store was advertising insignias and chevrons for armed forces personnel (Evening Tribune, 20 October 1949:5). In September 1950, the Cocoa Housing Authority received federal approval to construct fifty low rental public housing units (Evening Tribune, 14 September 1950:1). The City of Cocoa opened up the former municipal airport for housing development. Located west of US Route 1, 160 acres of the airport could accommodate up to 800 homes. The Clark Construction Company, of Winter Park, bought 80 acres at $100 per acre and left the remaining 80 acres unsold so that a local firm could purchase. If unsold, Clark had an option to purchase the remaining acreage. The next day, Clark submitted its financing application to the Federal Housing Authority (FHA) immediately and the day after that FHA was on site to assess the site. Clark indicated it would present three subdivision plans to the city for its selection of what was most desirable (Evening Tribune, 16 February 1950:1). The initial development would be known as Echo Park (Evening Tribune, 11 May 1950:2).

Less than one year after being appointed to the local housing authority Al Trafford's real estate firm announced more than a $125,000 in transactions, including FHA-VA financing for Rockledge Pines and Sherwood Forest subdivisions as well as for Gray-Porter Builders. The Public Housing Authority arrived in Cocoa to undertake a survey to quantify the housing market for low rental units (Evening Tribune, 11 January 1951).

Following the launch of Soviet satellites into orbit in 1957, American interests turned to exploration of space. Originally the new mission belonged to the Department of Defense, but in 1958, President Dwight D. Eisenhower formed NASA. In 1963, the agency received 35,612 ha (88,000 ac) on Merritt Island to build Kennedy Space Center. NASA commissioned a complex of over 50 buildings on the island. The complex eventually played a central role in the Viking and Voyager missions, launching probes to Mars and the outer reaches of the Solar System (*Florida Today* 24 Aug 2001; NPS 1983). The space industry greatly impacted the area and produced a second population boom in Brevard County as people arrived seeking work (Brevard County, Florida 2025). Brevard County grew by 371% from 1950 to 1960, and the population doubled again during the 1960s (Tebeau 1980). Cocoa's population tripled between 1950 and 1960, increasing to 12,294. Titusville nearly tripled its population between 1950 and 1960, rising from 2,604 residents to 6,410 (State of Florida 1945:85-86). Colonel Othel R. Deering, Commanding Officer of the JLRPG, told the Cocoa Parent-Teachers Association (PTA) that the base was anticipated to issue $9,000,000,000 in payroll by the end of 1951. He also acknowledged that the increasing population associated with the base strained extant housing and education, estimating that the school system would see an additional 300 high school students and 630 elementary students (Evening Tribune, January 19, 1950; 2).

The construction of KSC began in 1963 and included a complex of more than 50 buildings on the island and one of the largest single-story buildings in the world: the Vehicle Assembly Building. The facility was named John F. Kennedy Space Center in 1963 following the assassination of President John F. Kennedy. LC-39A was constructed in 1965 by Bendix-Boeing (Delahaye and Hinder 1996). On July 16, 1969, the first manned mission to the moon left KSC. Lifting off at exactly 9:32 am from LC-39A, the crew of the Apollo 11 left Earth and made the first lunar landing the next day (Delahaye and Hinder 1996; Uri 2019).

The space industry had a dramatic effect on the area. Brevard County grew by 371% from 1950 to 1960, and that population had doubled by 1970 (Tebeau 1980 [1971]). This growth continued, and by 1990, Brevard County had nearly 400,000 residents (US Census Bureau 1995). As the population increased in the cities of Brevard County, the demand for infrastructure and housing increased. Subdivision development in the APE continued through 1975; however, at a much slower pace than the period from 1946 to ca. 1964. One of the largest problems faced by the county was educating its new younger residents, whose parents worked or were connected to the missile programs at Canaveral. By 1956, Brevard County faced schools which were at capacity and required the federal government to assist them (Evening Tribune, 21 September 1956:5). During the 1950s, several new elementary schools were built including Gibson Elementary and High School for Negroes, Riverview Elementary, Whispering Hills Elementary, Rockledge Elementary School, and Parkway Junior High School (Evening Tribune, 15 April 1957:1; Lemon 1997); however, overcrowding continued to be an issue into the 1960s. In 1961, the NAACP filed a lawsuit against the Brevard School Board calling for desegregation. Trial was delayed until 1964. In 1968 the school year began with the enrollment of 63,500 students and the opening of seven new elementary schools, many of them temporary portable units. In 1968, Brevard County schools initiated a "freedom of choice" to allow African American students to voluntarily attend white schools (Hill 1968:57). Desegregation plans faced numerous setbacks including picketing the riots in places such as Rockledge (Kennerly 2016; Patterson and Hatcher-Gallop n.d.). In addition to serving the educational needs of a booming population, Cocoa struggled to meet the postal needs of residents, and the US government authorized a new 23,000 square feet post office to replace one built by the WPA in the 1930s (DiBiase and Imberman 2018). Brevard County reached nearly 400,000 residents in 1990 (Forstall 1996:30). That same year, 16,023 people resided in Rockledge (Andriot 1993:101).

In 2009, NASA converted a shuttle launchpad to a commercial launch site which could host multiple types of spacecraft. The Space Shuttle Program ended in 2011, and the Space Coast entered a new era of mostly unmanned flights but continued to host visitors and launches (Beutel 2010). Brevard County continued to benefit from its location along the Space Coast, reaching over 500,000 residents by 2010 (US Census Bureau 2025). Starting in 2014, NASA sought to establish partnerships with private companies, through their “Tipping Point” Awards and Commercial Crew Program (Sheetz 2019). In December 2019, the Department of Defense created a new branch of the military, the United State Space Force, which took control of the military installations in Brevard County (Wallace 2021).