DRAFT ENVIRONMENTAL IMPACT STATEMENT

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

at the Kennedy Space Center, Merritt Island, Florida

Volume II, Appendix B.3, Part 4

August 2025

Federal Aviation Administration

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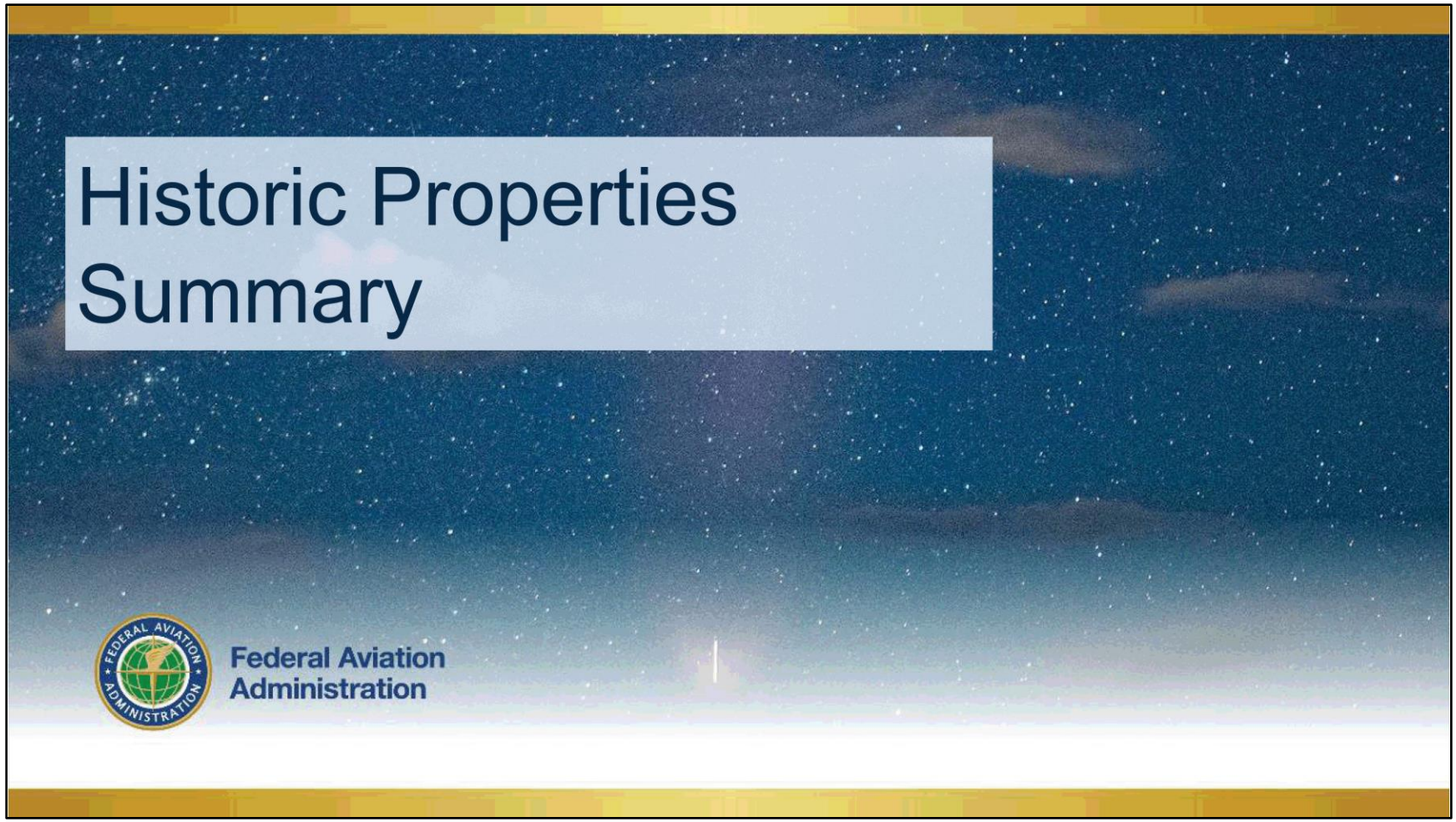
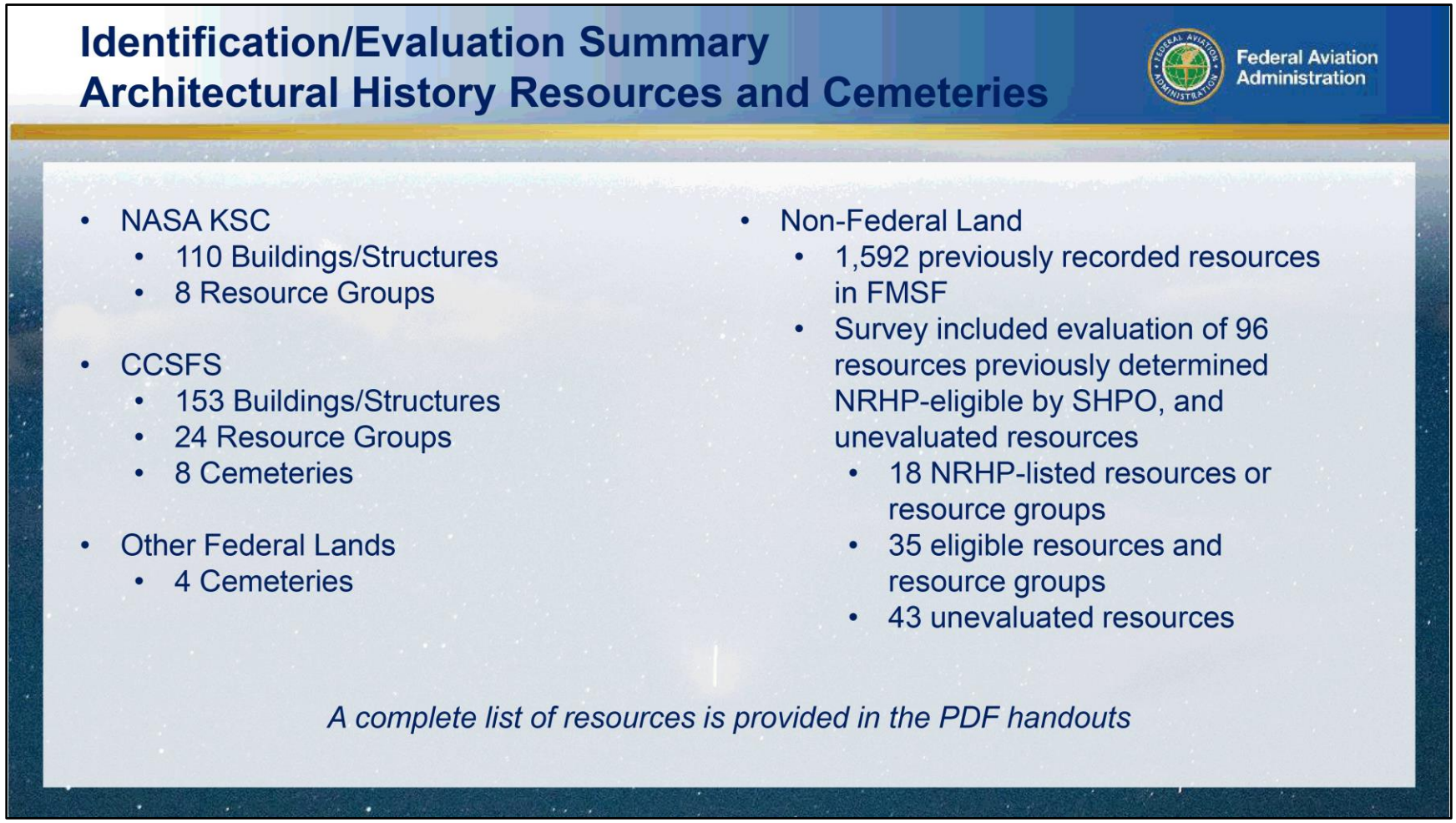

Historic Properties
Summary
Federal Aviation
Administration


Identification/Evaluation Summary
Architectural History Resources and Cemeteries
Federal Aviation Administration
• NASA KSC
• 110 Buildings/Structures
• 8 Resource Groups
• CCSFS
• 153 Buildings/Structures
• 24 Resource Groups
• 8 Cemeteries
• Other Federal Lands
• 4 Cemeteries
• Non-Federal Land
• 1,592 previously recorded resources in FMSF
• Survey included evaluation of 96 resources previously determined NRHP-eligible by SHPO, and unevaluated resources
• 18 NRHP-listed resources or resource groups
• 35 eligible resources and resource groups
• 43 unevaluated resources
A complete list of resources is provided in the PDF handouts

Architectural History Resources and Max psf

Federal Aviation Administration

- Of the extant architectural resources discussed in the CRAS;
  - Less than 7% will experience ≥ 20 psf
  - Approximately 10% will experience ≥ 10 psf
  - Most sites, approximately 85%, will experience ≤ 6 psf
- ≥ 20 psf;
  - The resources are associated with LC-39A and LC-39B and were built to withstand concussive forces associated with launch activities.

Psf (Max)	Number of Resources
≥20 psf	34
10-20 psf	39
6-10 psf	144
4-6 psf	51
2-4 psf	246

Architectural History Resources and dB (>130 dB)

Federal Aviation Administration

- Of the architectural resources/resource groups discussed in the CRAS;
  - 83 are within the 130 dB area
- Within the 130 db area;
  - Most structures were built to withstand concussive forces associated with launch activities
  - 8BR02990 (Beach House) is eligible for NRHP-listing and within the 130 dB contour

dB	Number of Resources
>130 dB	83

Identification/Evaluation Summary Archaeological Sites

Federal Aviation Administration

- 354 archaeological sites recorded in APE
  - 261 lack above ground components, were previously determined ineligible, or are not flagged for presence of human remains
  - 93 sites eligible/potentially eligible for NRHP, or are unevaluated, and have above ground components/landscape features, or may contain human remains including;
    - 33 flagged for human remains
    - 34 mounds, shell mounds/middens, or potential mounds
    - 55 with potential historic-era above ground components

A complete list of archaeological sites in the APE is provided in the PDF handouts

Archaeological Sites and Max psf

Federal Aviation Administration

- Of the 354 archaeological sites recorded in APE;
  - Less than 2% will experience ≥20 psf area
  - Less than 11% will experience ≥ 10 psf
  - Most sites, approximately 89%, will experience 6 psf or less
- ≥ 20 psf;
  - Five sites were determined ineligible for the NRHP
  - One site has insufficient information to determine NRHP-eligibility

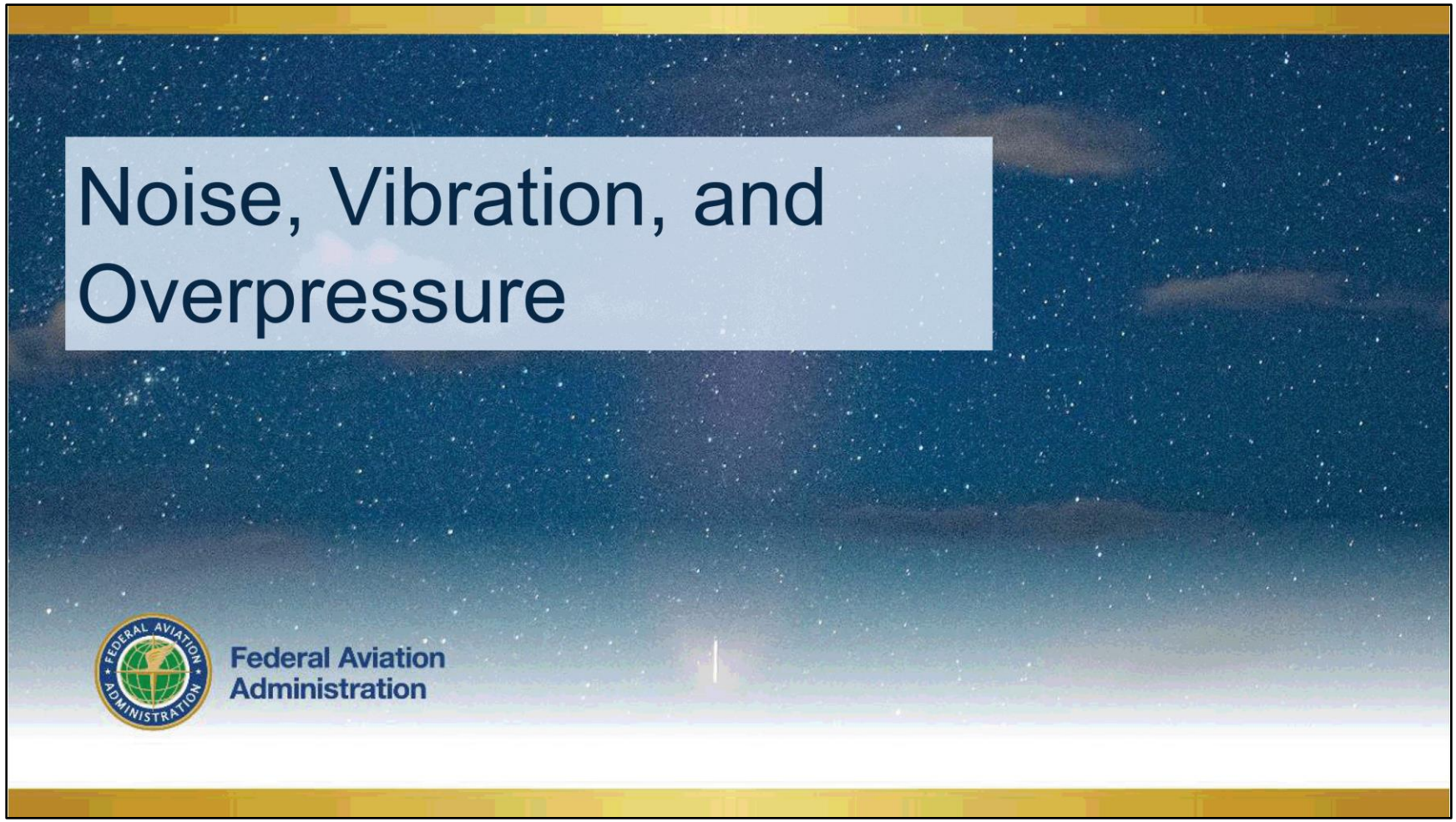
Psf (Max)	Number of Sites
≥20 psf	6
10-20 psf	32
6-10 psf	70
4-6 psf	157
2-4 psf	89

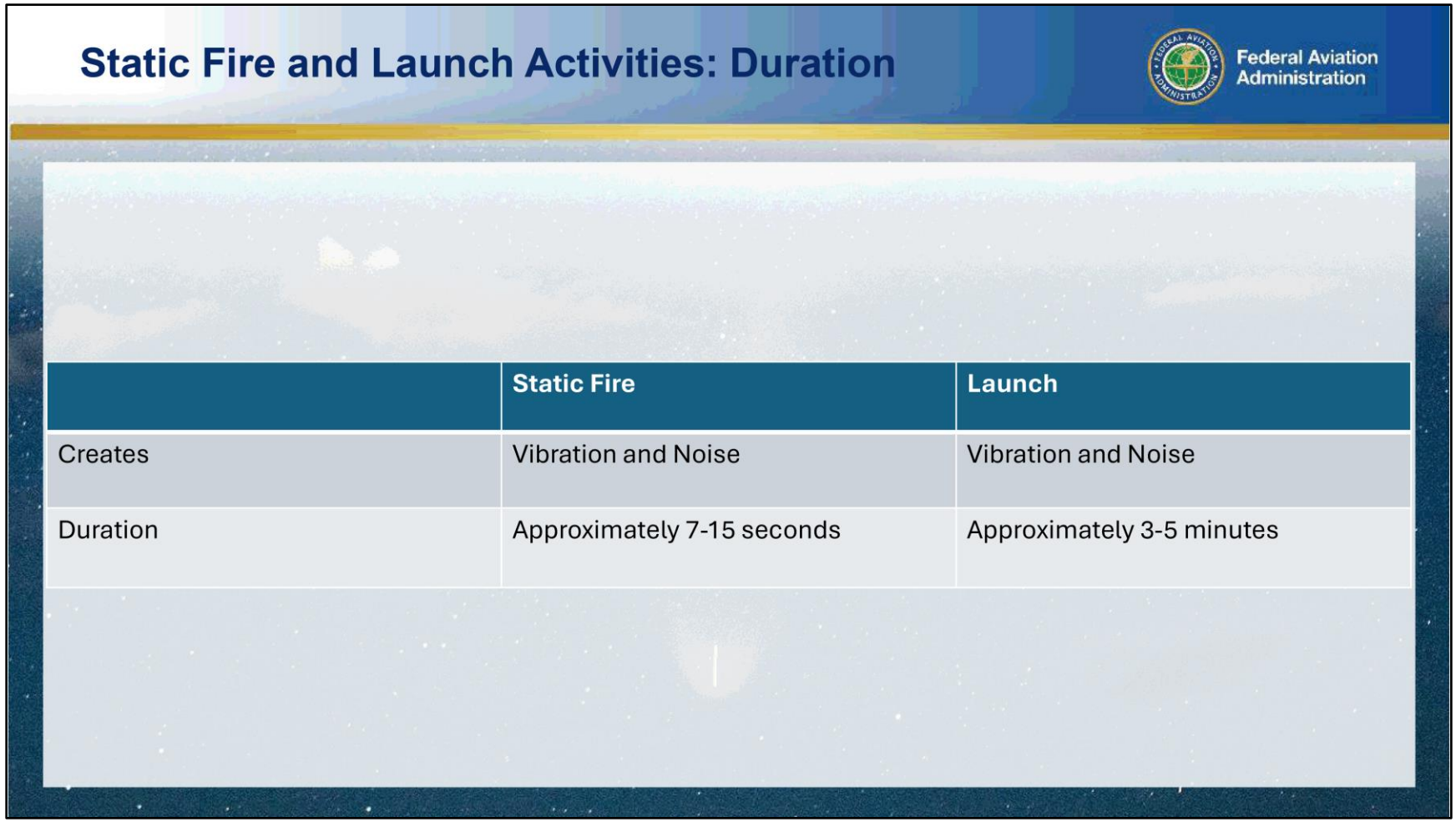
Archaeological Sites and dB (>130 dB)

Federal Aviation Administration

- Of the 354 archaeological sites recorded in APE;
  - 14 are within the 130 dB area
- Within the 130 dB area;
  - Ten sites were determined ineligible for the NRHP
  - Two sites were determined eligible for the NRHP
  - One site has insufficient information to determine NRHP-eligibility (8BR00206).
  - One site has not been evaluated for NRHP eligibility
  - No sites are flagged in FMSF as potentially containing human remains

dB	Number of Sites
>130 dB	14


Noise, Vibration, and Overpressure
Federal Aviation Administration



	Static Fire	Launch
Creates	Vibration and Noise	Vibration and Noise
Duration	Approximately 7-15 seconds	Approximately 3-5 minutes

Static Fire and Launch: Noise and Vibration

Federal Aviation Administration

dB	Potential Effects to Buildings/Structures	Potential Effects to Archaeological Sites
130 dB+	Possible damage to glass and plaster (Fenton and Methold 2016).	Possible effects from repeated exposure. Post-launch studies of above-ground archaeological sites at Vandenberg SFB noted no effects, but effects to subsurface sites or site-types common in the APE are not thoroughly studied.
≤130 dB	Glass/plaster damage unlikely, but not impossible. Possible wearing of joints/structural elements over repeated exposures (Fenton and Methold 2016, Nocerino et al. 2021, NCRHP 2012).	Effects considered unlikely. Post-launch studies of above-ground archaeological sites at Vandenberg SFB noted no effects, but effects to subsurface sites or site-types common in the APE are not thoroughly studied.

Landing: Sonic Boom Overpressure (psf)

Federal Aviation Administration

	Landings
Creates	Pressure per square foot
Duration	<1 second
Potential Effects/to Buildings/Structures	Window breakage. Damage to plaster walls and ceilings.
Potential Effects to Archaeological Sites	Not thoroughly studied. Effects unlikely. Ground motion resulting from sonic booms is rare (USAF 2024).
Resources/References	White 1972, Haber et al. 1989, Nocerino et al. 2021

Structural Damage Potential

Federal Aviation Administration

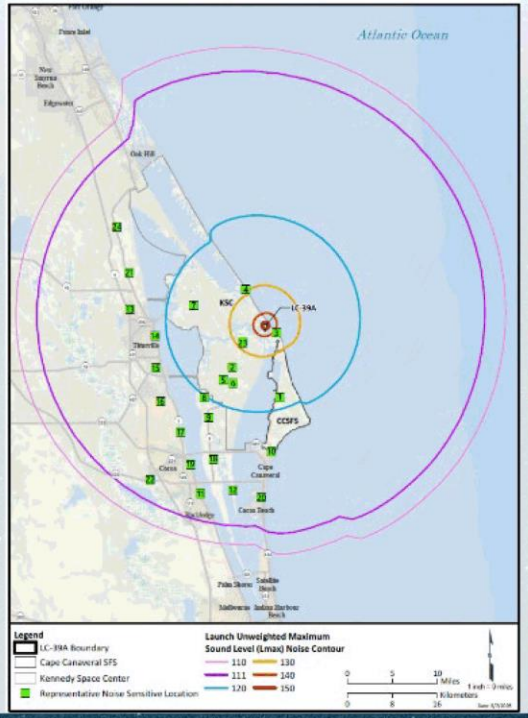
Propulsion Noise

- >111 dB Lmax (1/1,000 risk of damage claim) large area off-installation
- >120 dB Lmax (1/100 risk of damage claim) very small off-installation area, multiple sensitive locations on KSC/CCSFS
- >130 dB Lmax (substantial risk) on-KSC within ~4 miles of LC-39A

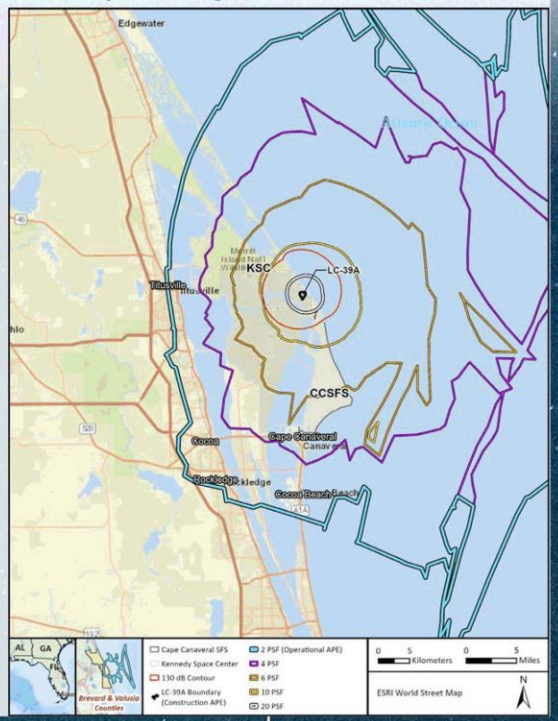
Sonic Booms

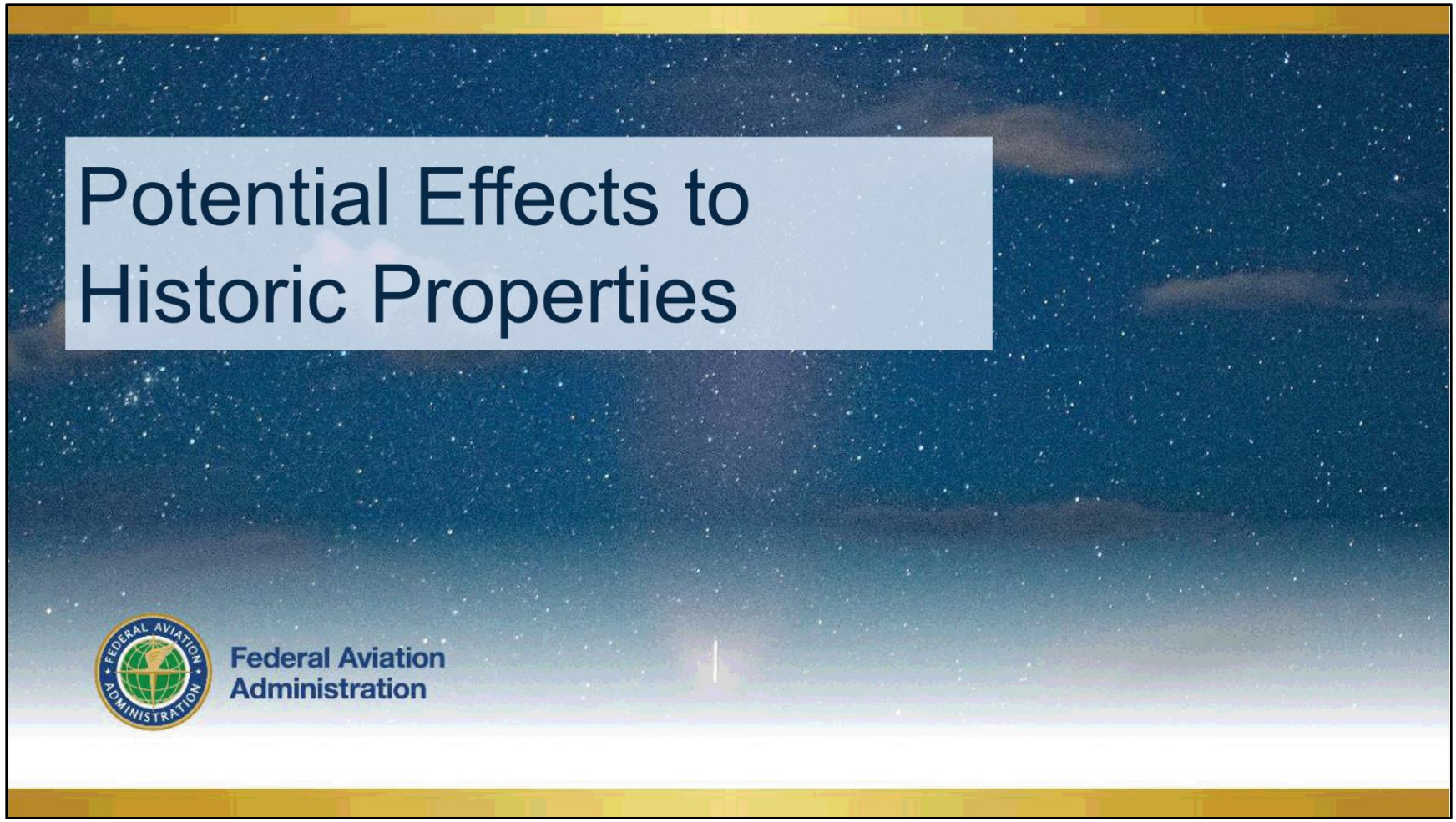
- >2 PSF (1/10,000 risk for large window breakage) in off-installation areas for booster landings (see map on previous slide)
- >4 PSF (1/10,000 risk for small windows) in portions of Merritt Island
- >10 PSF within ~5 miles of LC-39A (on KSC/CCSFS)
- <2 PSF for Starship landings all locations

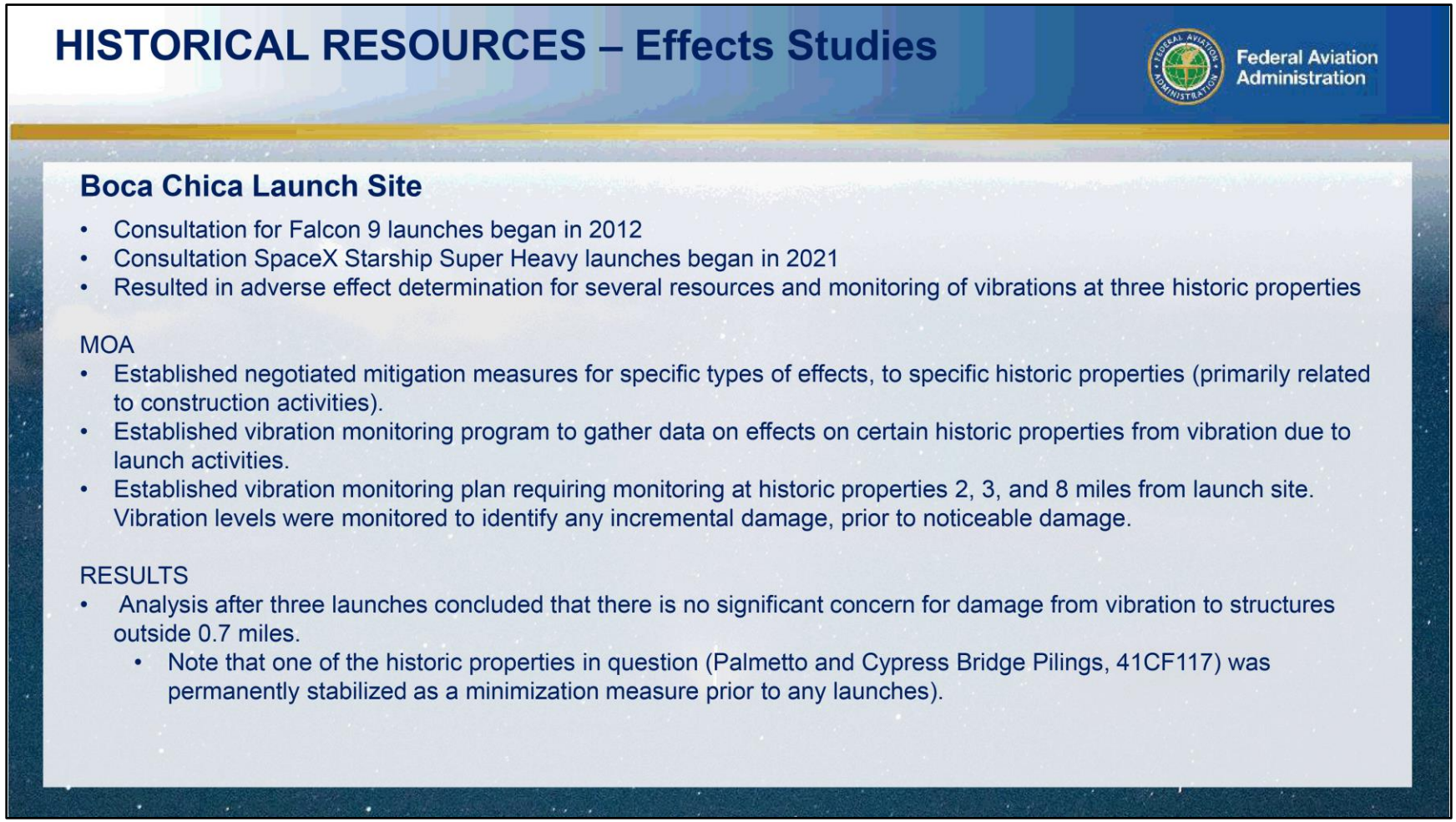
Launch Lmax

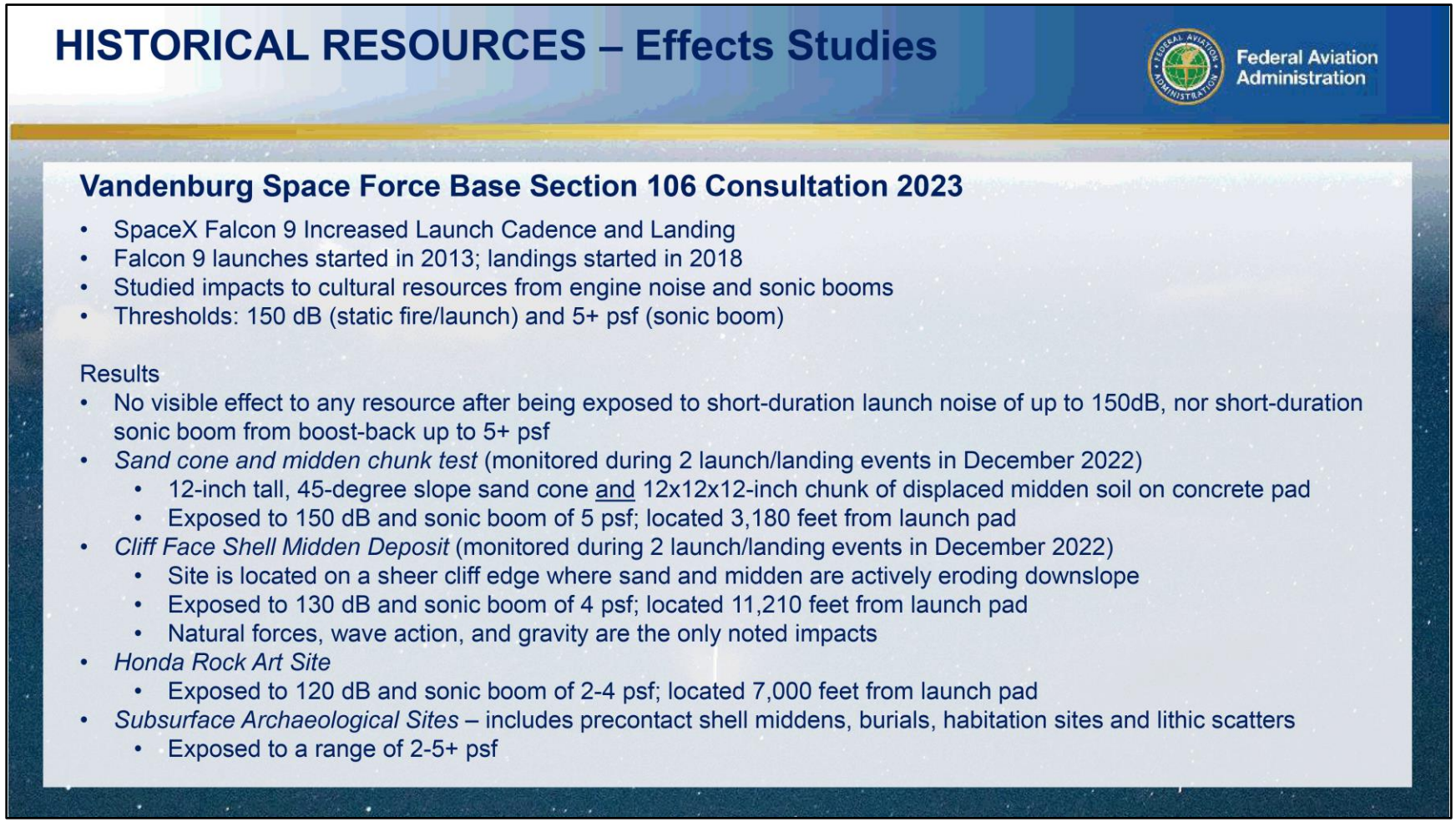


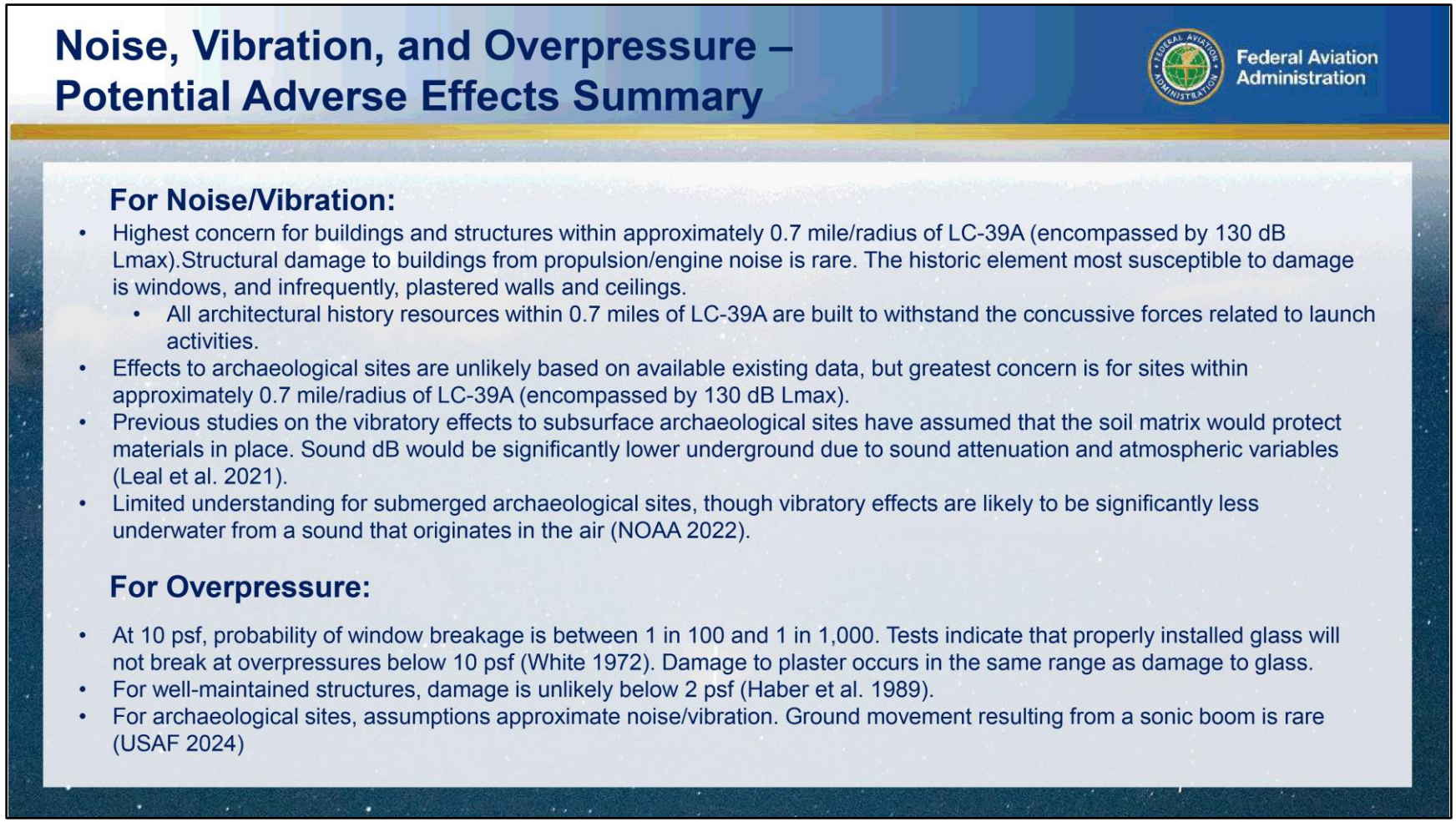
Starship Landing PSF

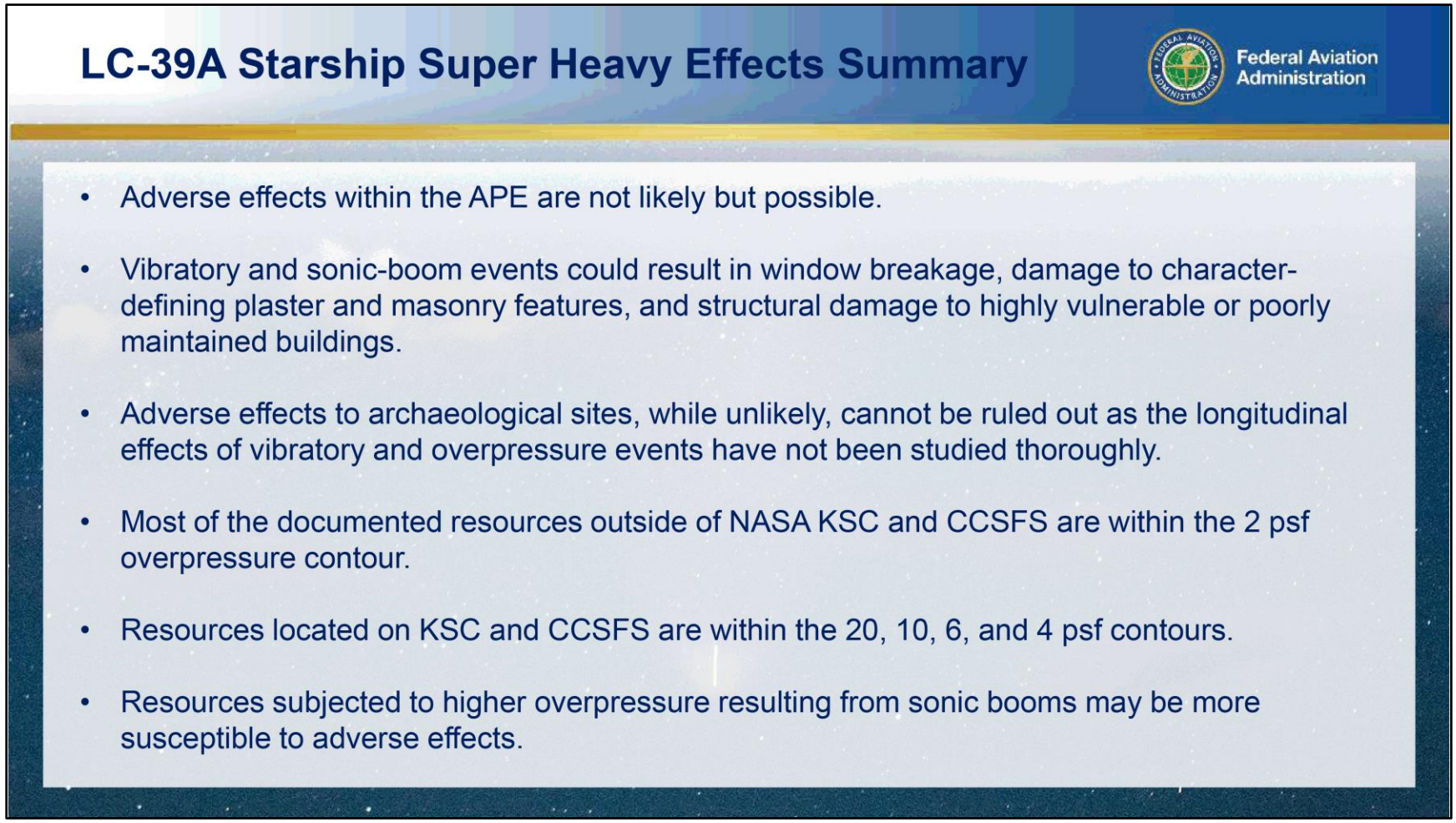



Potential Effects to Historic Properties
Federal Aviation Administration


HISTORICAL RESOURCES – Effects Studies
Federal Aviation Administration
Boca Chica Launch Site
• Consultation for Falcon 9 launches began in 2012
• Consultation SpaceX Starship Super Heavy launches began in 2021
• Resulted in adverse effect determination for several resources and monitoring of vibrations at three historic properties
MOA
• Established negotiated mitigation measures for specific types of effects, to specific historic properties (primarily related to construction activities).
• Established vibration monitoring program to gather data on effects on certain historic properties from vibration due to launch activities.
• Established vibration monitoring plan requiring monitoring at historic properties 2, 3, and 8 miles from launch site. Vibration levels were monitored to identify any incremental damage, prior to noticeable damage.
RESULTS
• Analysis after three launches concluded that there is no significant concern for damage from vibration to structures outside 0.7 miles.
• Note that one of the historic properties in question (Palmetto and Cypress Bridge Pilings, 41CF117) was permanently stabilized as a minimization measure prior to any launches).

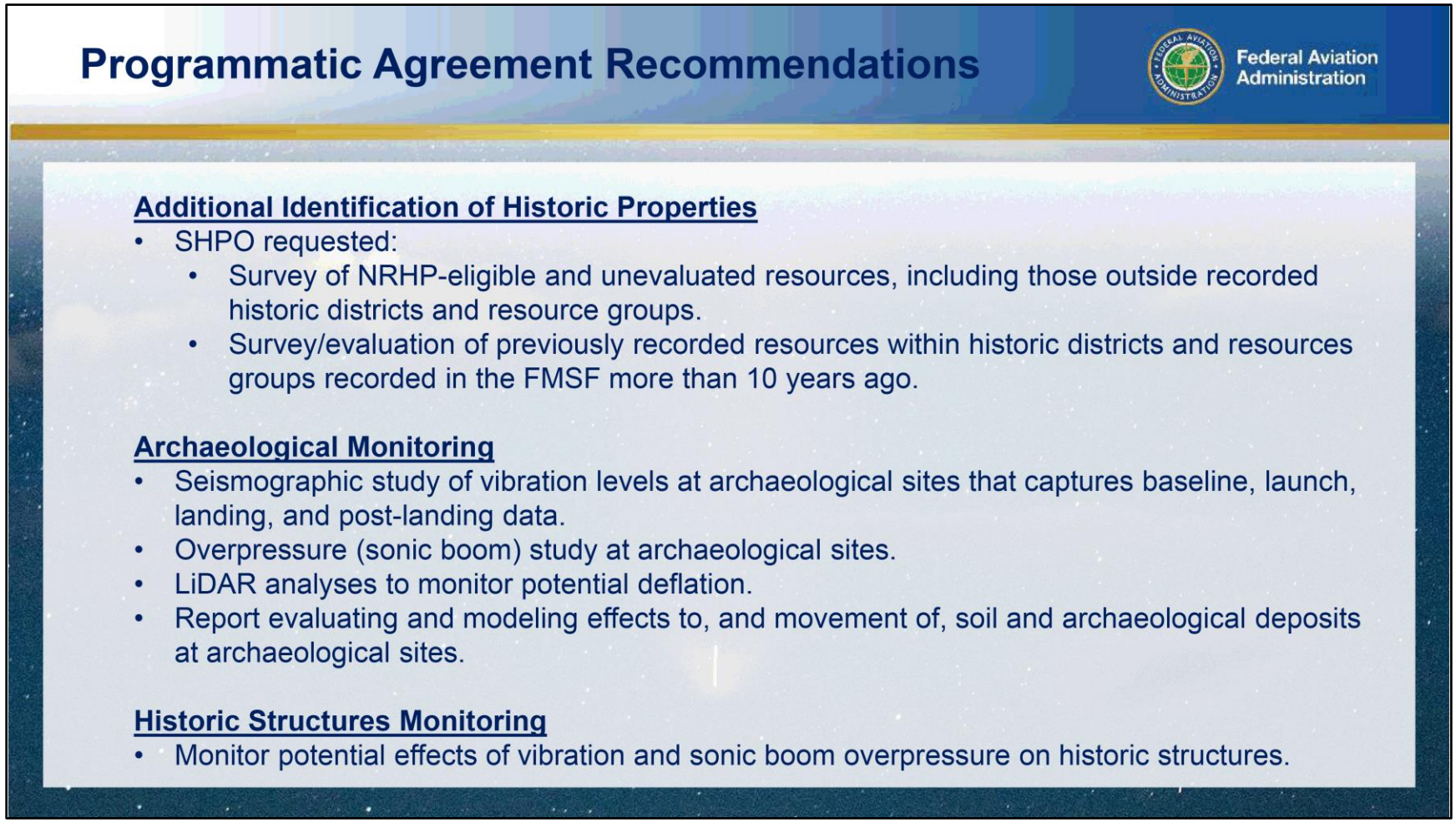

HISTORICAL RESOURCES – Effects Studies
Federal Aviation Administration
Vandenburg Space Force Base Section 106 Consultation 2023
• SpaceX Falcon 9 Increased Launch Cadence and Landing
• Falcon 9 launches started in 2013; landings started in 2018
• Studied impacts to cultural resources from engine noise and sonic booms
• Thresholds: 150 dB (static fire/launch) and 5+ psf (sonic boom)
Results
• No visible effect to any resource after being exposed to short-duration launch noise of up to 150dB, nor short-duration sonic boom from boost-back up to 5+ psf
• Sand cone and midden chunk test (monitored during 2 launch/landing events in December 2022)
• 12-inch tall, 45-degree slope sand cone and 12x12x12-inch chunk of displaced midden soil on concrete pad
• Exposed to 150 dB and sonic boom of 5 psf; located 3,180 feet from launch pad
• Cliff Face Shell Midden Deposit (monitored during 2 launch/landing events in December 2022)
• Site is located on a sheer cliff edge where sand and midden are actively eroding downslope
• Exposed to 130 dB and sonic boom of 4 psf; located 11,210 feet from launch pad
• Natural forces, wave action, and gravity are the only noted impacts
• Honda Rock Art Site
• Exposed to 120 dB and sonic boom of 2-4 psf; located 7,000 feet from launch pad
• Subsurface Archaeological Sites – includes precontact shell middens, burials, habitation sites and lithic scatters
• Exposed to a range of 2-5+ psf

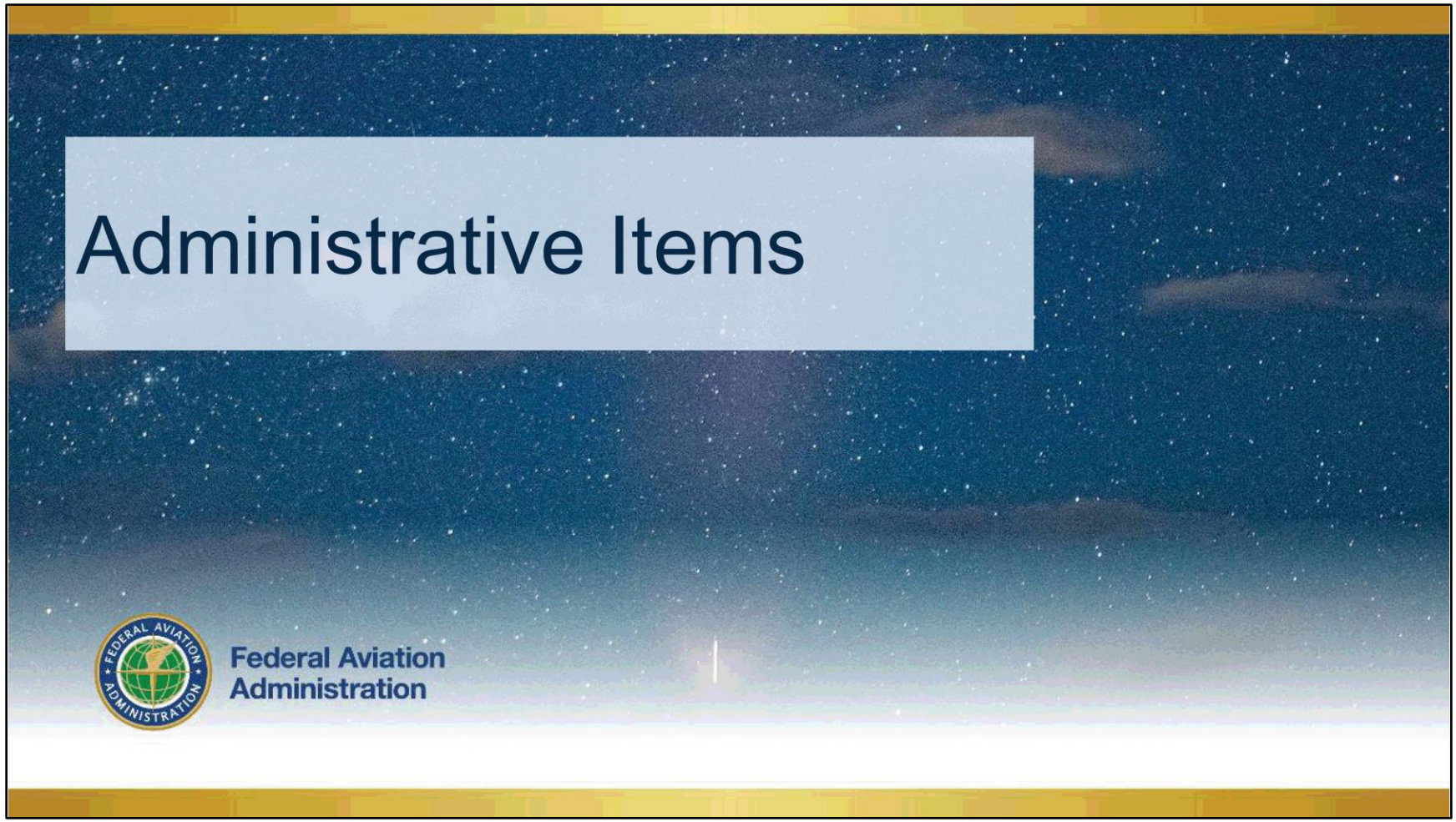

Noise, Vibration, and Overpressure –
Potential Adverse Effects Summary
Federal Aviation Administration
For Noise/Vibration:
• Highest concern for buildings and structures within approximately 0.7 mile/radius of LC-39A (encompassed by 130 dB Lmax).Structural damage to buildings from propulsion/engine noise is rare. The historic element most susceptible to damage is windows, and infrequently, plastered walls and ceilings.
• All architectural history resources within 0.7 miles of LC-39A are built to withstand the concussive forces related to launch activities.
• Effects to archaeological sites are unlikely based on available existing data, but greatest concern is for sites within approximately 0.7 mile/radius of LC-39A (encompassed by 130 dB Lmax).
• Previous studies on the vibratory effects to subsurface archaeological sites have assumed that the soil matrix would protect materials in place. Sound dB would be significantly lower underground due to sound attenuation and atmospheric variables (Leal et al. 2021).
• Limited understanding for submerged archaeological sites, though vibratory effects are likely to be significantly less underwater from a sound that originates in the air (NOAA 2022).
For Overpressure:
• At 10 psf, probability of window breakage is between 1 in 100 and 1 in 1,000. Tests indicate that properly installed glass will not break at overpressures below 10 psf (White 1972). Damage to plaster occurs in the same range as damage to glass.
• For well-maintained structures, damage is unlikely below 2 psf (Haber et al. 1989).
• For archaeological sites, assumptions approximate noise/vibration. Ground movement resulting from a sonic boom is rare (USAF 2024)

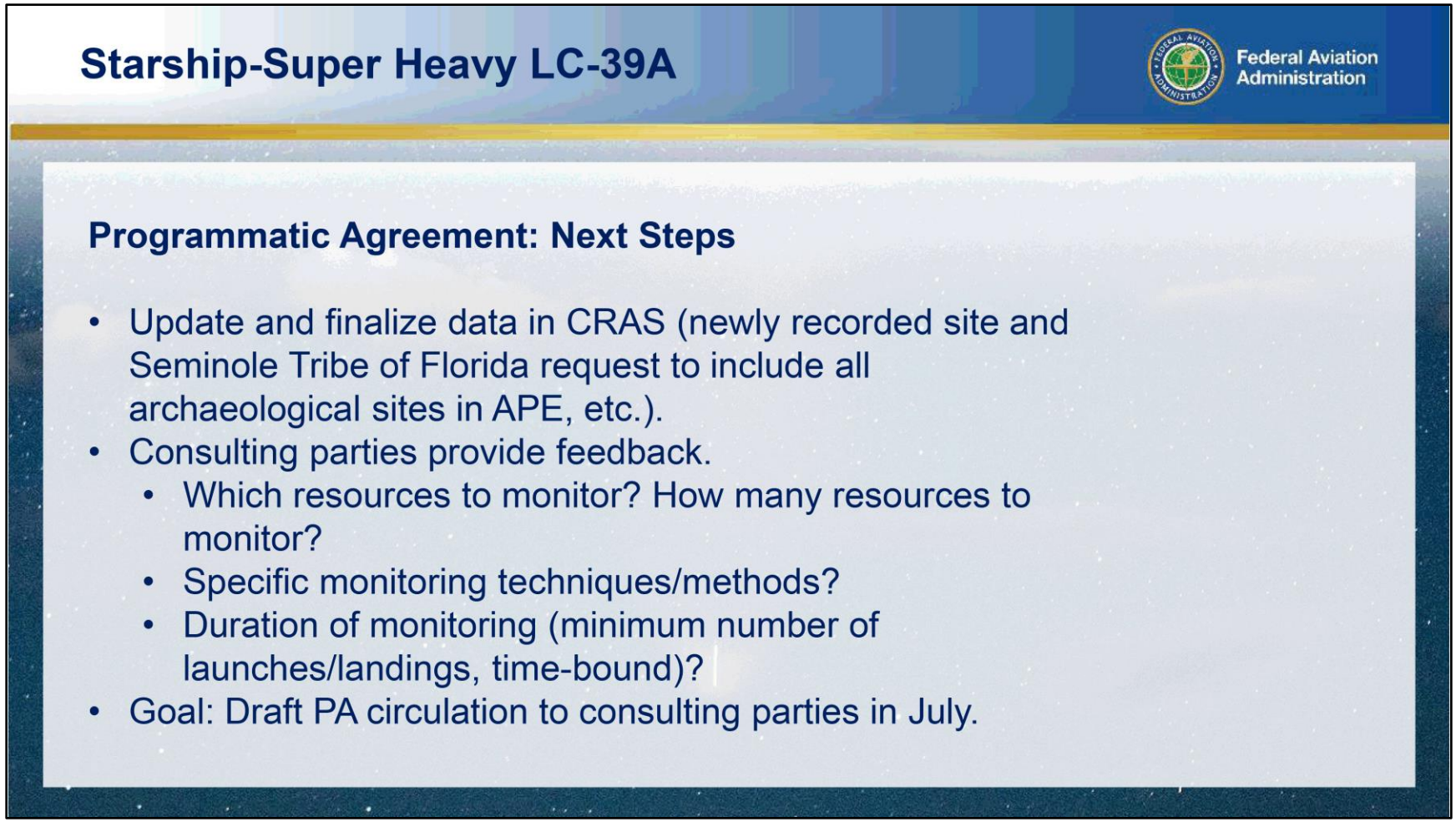

LC-39A Starship Super Heavy Effects Summary
Federal Aviation Administration
• Adverse effects within the APE are not likely but possible.
• Vibratory and sonic-boom events could result in window breakage, damage to character-defining plaster and masonry features, and structural damage to highly vulnerable or poorly maintained buildings.
• Adverse effects to archaeological sites, while unlikely, cannot be ruled out as the longitudinal effects of vibratory and overpressure events have not been studied thoroughly.
• Most of the documented resources outside of NASA KSC and CCSFS are within the 2 psf overpressure contour.
• 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.

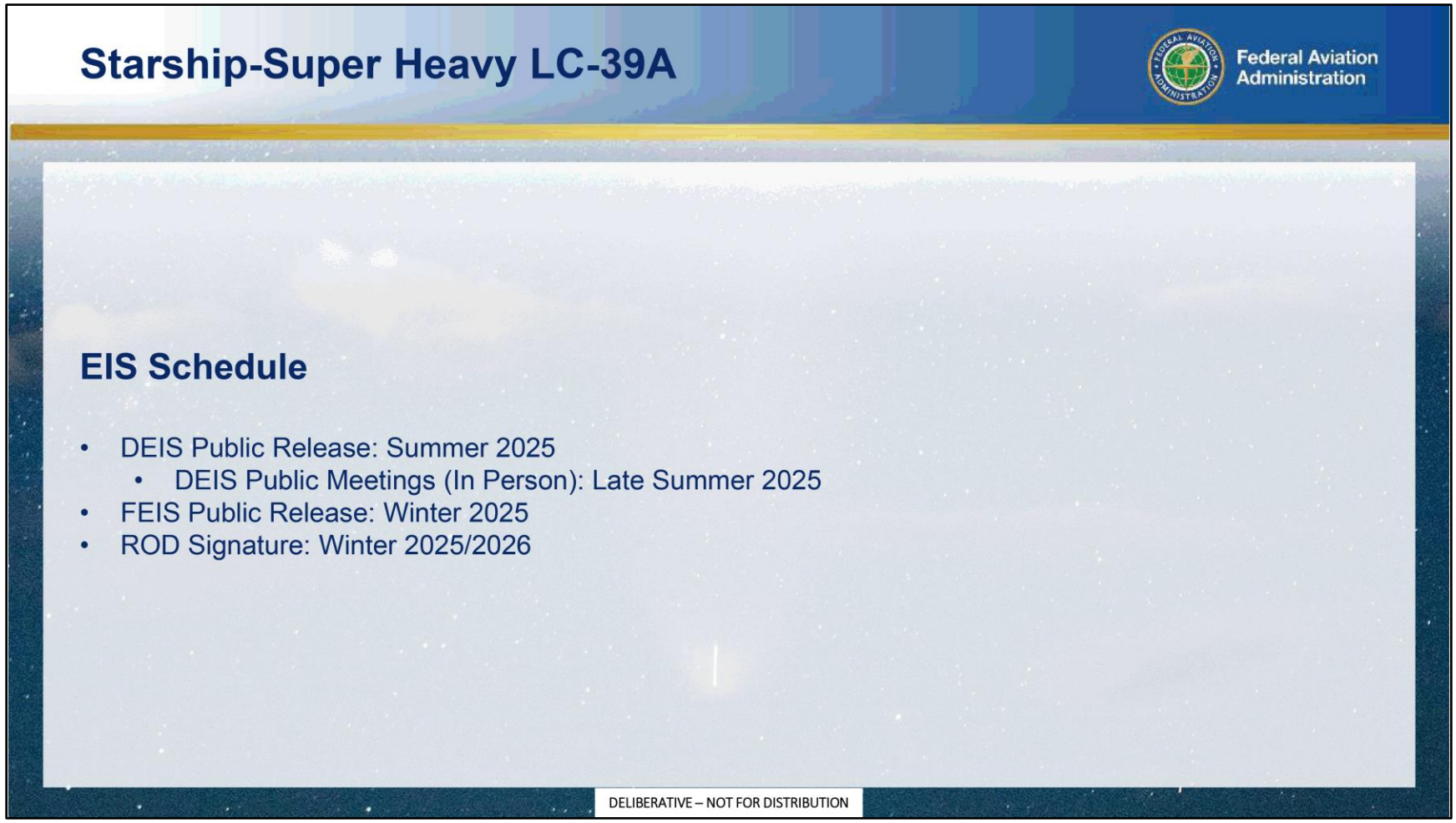

Programmatic
Agreement
Federal Aviation
Administration

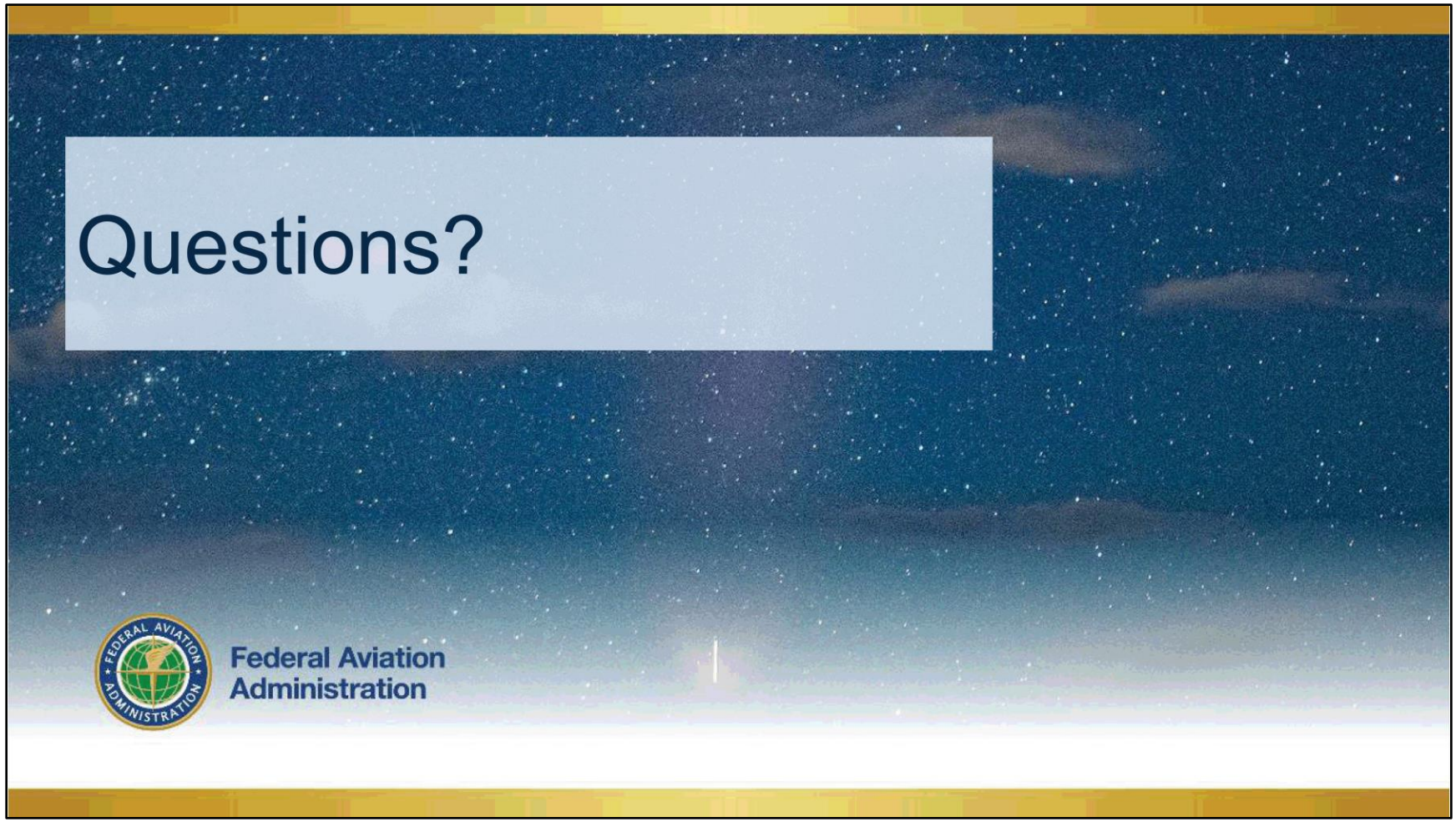

Programmatic Agreement Overview
Federal Aviation Administration
• Because a final determination of how SSH launch and landing activities will affect historic properties is not possible at this time, a programmatic agreement is necessary.
• PA will be developed pursuant to 36 CFR § 800.14(b), to govern the implementation of a program for the assessment of effects on historic properties and the resolution of adverse effects on historic properties.
• PA will be modelled on the agreement executed for resolution of adverse effects and monitoring of historic properties for the operation of the SpaceX Boca Chica launch site in Cameron County, Texas.
• PA will require the development of plans for monitoring architectural history and archaeological resources, the additional identification of historic properties within the APE, and an inadvertent discoveries plan.
• Any adverse effects identified through monitoring will be resolved through the execution of a Memorandum of Agreement, or through pre-negotiated mitigations.


Programmatic Agreement Recommendations
Federal Aviation Administration
Additional Identification of Historic Properties
• SHPO requested:
• Survey of NRHP-eligible and unevaluated resources, including those outside recorded historic districts and resource groups.
• Survey/evaluation of previously recorded resources within historic districts and resources groups recorded in the FMSF more than 10 years ago.
Archaeological Monitoring
• Seismographic study of vibration levels at archaeological sites that captures baseline, launch, landing, and post-landing data.
• Overpressure (sonic boom) study at archaeological sites.
• LiDAR analyses to monitor potential deflation.
• Report evaluating and modeling effects to, and movement of, soil and archaeological deposits at archaeological sites.
Historic Structures Monitoring
• Monitor potential effects of vibration and sonic boom overpressure on historic structures.


Administrative Items
Federal Aviation Administration


Starship-Super Heavy LC-39A
Federal Aviation Administration
Programmatic Agreement: Next Steps
• Update and finalize data in CRAS (newly recorded site and Seminole Tribe of Florida request to include all archaeological sites in APE, etc.).
• Consulting parties provide feedback.
• Which resources to monitor? How many resources to monitor?
• Specific monitoring techniques/methods?
• Duration of monitoring (minimum number of launches/landings, time-bound)?
• Goal: Draft PA circulation to consulting parties in July.


Starship-Super Heavy LC-39A
Federal Aviation Administration
EIS Schedule
• DEIS Public Release: Summer 2025
• DEIS Public Meetings (In Person): Late Summer 2025
• FEIS Public Release: Winter 2025
• ROD Signature: Winter 2025/2026
DELIBERATIVE – NOT FOR DISTRIBUTION


Questions?
Federal Aviation Administration

Buildings/Structures – Monitoring and Mitigation

Federal Aviation Administration

Potential Monitoring Approach

- Collection of baseline structural information, vibratory and overpressure data over multiple launches and landings.
- A report assessing and evaluating changes or damage to structures beyond baseline condition.
- Report will include effects assessments.
- Structures to monitor will be included in monitoring plan developed through consultation with PA signatories.

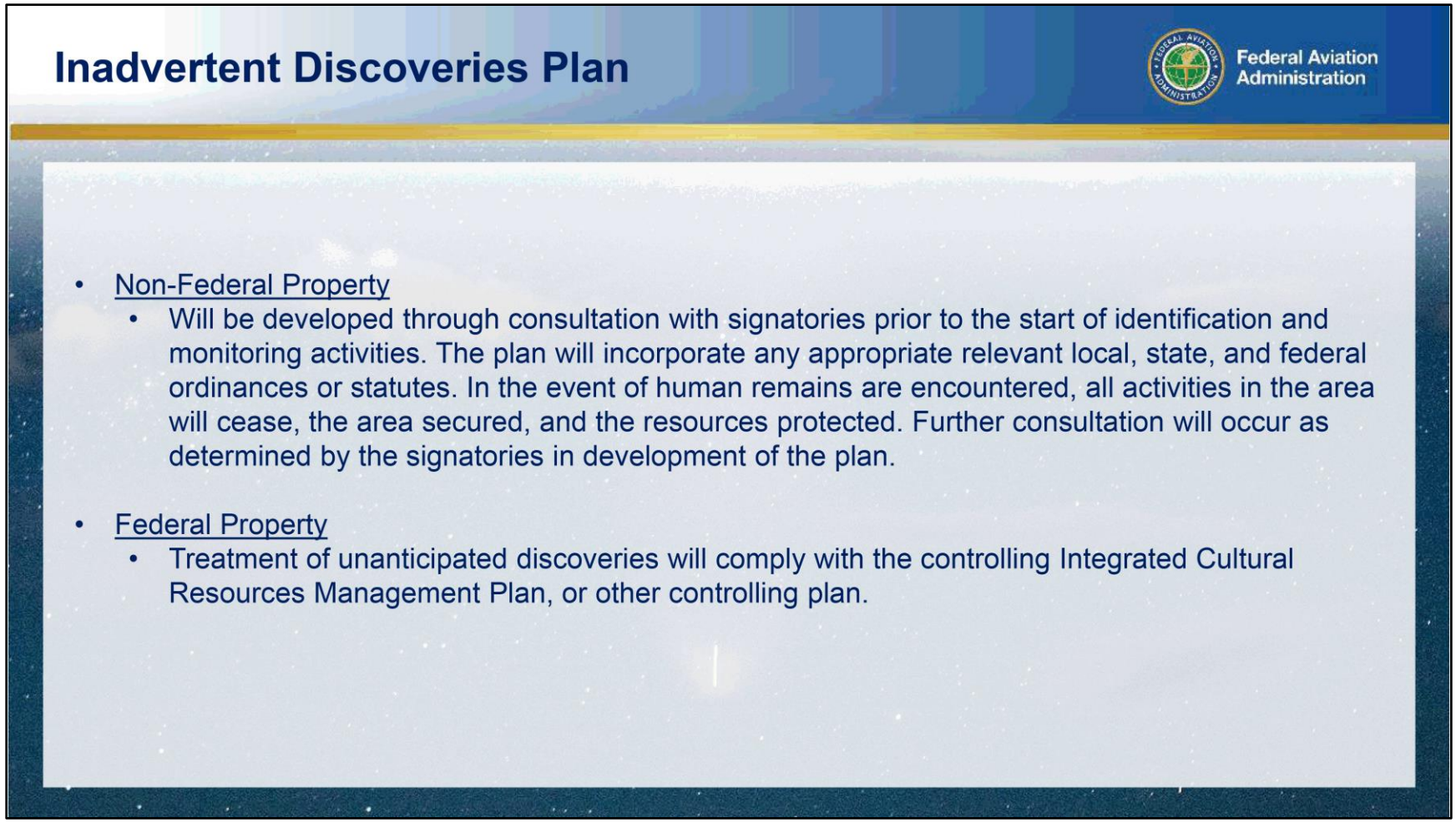
Archaeological Resources – Monitoring and Mitigation

Federal Aviation Administration

Potential Monitoring Approaches

Longitudinal, minimally intrusive monitoring

- Seismographic data collection of vibration levels at three or more sites that captures baseline, launch, landing, and post-landing data.
- Collection of overpressure data generated during landing activities at three or more sites.
- A report evaluating and modeling effects to, and movement of, soil and archaeological deposits at each archaeological site.
- Report will include effects assessments.
- Sites to monitor will be included in monitoring plan developed through consultation with PA signatories.


Inadvertent Discoveries Plan
Federal Aviation Administration
• Non-Federal Property
• Will be developed through consultation with signatories prior to the start of identification and monitoring activities. The plan will incorporate any appropriate relevant local, state, and federal ordinances or statutes. In the event of human remains are encountered, all activities in the area will cease, the area secured, and the resources protected. Further consultation will occur as determined by the signatories in development of the plan.
• Federal Property
• Treatment of unanticipated discoveries will comply with the controlling Integrated Cultural Resources Management Plan, or other controlling plan.

Noise – Contingency Landing Scenario

Federal Aviation Administration

Propulsion Noise

- Booster contingency landing noise levels generally less than nominal landing levels on land
- Booster contingency landing area: Minimum 5 NM offshore in area bounded by 40- and 115-degree launch trajectories
- Starship contingency landing noise levels analysis is still under development
- Starship contingency landing area: minimum 1 NM off-shore (purple and yellow shaded areas in the figure to the right)

Sonic Booms

- Booster contingency landing boom overpressures less than for nominal landing
- Starship contingency landing booms could hypothetically exceed 1 psf but would not exceed 1.7 psf in land areas bounded by blue dashed line in figure to the right
- Less than 5 contingency landings per year are expected
- Contingency landing area extends more than 1,000 miles - landings in portions that are far from shore would not be audible on shore
- Booms exceeding 1 psf on shore in blue-dashed are would be extremely rare

Land Areas Hypothetically Affected by 1 to 1.7 PSF

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.
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?

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

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.

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

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.

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

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

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

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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.

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

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

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.

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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?

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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

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SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE
THPO PHONE: (863) 983-6549
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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)

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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

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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
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