DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration
Office of Commercial Space Transportation

Mitigated Finding of No Significant Impact and Record of Decision for Final Tiered Environmental Assessment for SpaceX Starship/Super Heavy Vehicle Increased Cadence at the SpaceX Boca Chica Launch Site in Cameron County, Texas

Summary

In 2022, the Federal Aviation Administration (FAA) prepared a Final Programmatic Environmental Assessment (2022 PEA) to analyze the potential environmental impacts of issuing an experimental permit(s) and/or a vehicle operator license to SpaceX for Starship/Super Heavy launch operations at its existing Boca Chica Launch Site in Cameron County, Texas. The federal action also included the FAA's issuance of temporary airspace closures. The Mitigated Finding of No Significant Impact and Record of Decision for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas was issued in June 2022.

The FAA prepared the attached Final Tiered Environmental Assessment (Final Tiered EA) to analyze the potential environmental impacts of modifying SpaceX's vehicle operator license for Starship Super/Heavy launches from Boca Chica (VOL-23-129) that would allow for an increased launch and landing cadence of the Starship/Super Heavy launch vehicle at its existing Boca Chica Launch Site in Cameron County, Texas. The Final Tiered EA was prepared in accordance with the FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* (July 16, 2015), to meet the agency's obligations under Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA), § § 4321-4336, as amended through P.L. 118–5 (June 3, 2023).[1]). This Final Tiered EA is tiered from the 2022 Final Programmatic

[1] On January 20, 2025, President Trump issued Executive Order (EO) No. 14154, *Unleashing American Energy*, which revoked EO 11991, Relating to Protection and Enhancement of Environmental Quality (May 24, 1977), and instructed the Chair of the CEQ to rescind its NEPA-implementing regulations. On February 25, 2025, the CEQ issued an interim final rule to remove the existing implementing regulations for NEPA (90 Fed. Reg. 10610 (Feb. 25, 2025), effective April 11, 2025. The Draft Tiered EA was prepared in accordance with CEQ's National Environmental Policy Act Implementing Regulations Revision Phase 2, 89 Fed. Reg. 35442 (May 1, 2024) (Phase 2 final rule)..

Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the SpaceX Boca Chica Launch Site in Cameron County, Texas.

After reviewing and analyzing this Final Tiered EA, including all available data and information on existing conditions and potential impacts, the FAA has determined that modifying SpaceX's vehicle operator license supporting the increased launch and landing cadence of the Starship/Super Heavy launch vehicle would not significantly impact the quality of the human environment within the meaning of NEPA. Therefore, the preparation of an Environmental Impact Statement is not required, and the FAA is independently issuing this Mitigated FONSI and ROD. The FAA has made this determination in accordance with applicable environmental laws and FAA regulations. The Final Tiered EA is incorporated by reference into this Mitigated FONSI/ROD.

For any questions or to request a copy of the Final Tiered EA, contact the following FAA Environmental Protection Specialist. A copy of the Final Tiered EA may also be obtained from the FAA's website: https://www.faa.gov/space/stakeholder_engagement/spacex_starship

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Purpose and Need

The purpose of SpaceX's proposed action is to provide greater mission capability to NASA and the Department of Defense (DOD). SpaceX's activities would continue to fulfill the U.S. expectation that increased capabilities and reduced space transportation costs will enhance exploration (including within the Artemis and Human Landing System programs), support U.S. national security, and make space access more affordable. The Space Transportation section of the National Space Transportation Policy of 1994 addressed the commercial launch sector, stating that "assuring reliable and affordable access to space through U.S. space transportation capabilities is a fundamental goal of the U.S. space program." Additionally, the 2021 Space Priorities Framework's Mission states, "The United States will bolster the health and vitality of our space sectors – civil, commercial, and national security – for the benefit of the American people and leverage that strength to lead the international community in preserving the benefits of space for future generations".

SpaceX's proposed action is needed to facilitate frequent launch and landing operations to allow iterative development of Starship/Super Heavy vehicles to achieve rapid launch capability and increase operational efficiency, capabilities, and cost effectiveness of the Starship/Super Heavy program. The proposed action would reduce the cost of launch and increase efficiency, delivering greater access to space and enabling cost-effective delivery of cargo and people to the Moon and Mars. SpaceX's proposed action would satisfy requirements for more efficient and effective space transportation methods and continue the U.S. goal of encouraging activities by the private sector to strengthen and expand U.S. space transportation infrastructure.

Proposed Action

SpaceX's Proposed Action is to increase the cadence of the Starship/Super Heavy launch program at the Boca Chica vertical launch area (VLA) in Cameron County, Texas to up to 25 annual launches and 50 total annual landings (25 of the Starship and 25 of the Super Heavy) and make vehicle and operational upgrades. Up to three launches (of the total 25) would occur during nighttime hours from the VLA. Landings at the VLA would only take place during the daytime, with up to 22 Starship and 22 Super Heavy landings at the VLA. Daytime landings of either vehicle may also take place offshore as well. Up to three landings of Starship and three landings of Super Heavy may occur at night, only offshore. SpaceX would also conduct up to 90 seconds of licensed daytime Starship static fire tests and 70 seconds of licensed daytime Super Heavy static fire tests a year.

Federal Action

The FAA's Federal Action is to modify SpaceX's existing vehicle operator license to authorize SpaceX to increase the cadence of the Starship/Super Heavy launch program at the Boca Chica VLA in Cameron County, Texas, along with potential renewals and modifications to licenses within the scope of operations analyzed in the Final Tiered EA. In addition, the FAA's Federal Action also includes the issuance of temporary airspace closures.

Alternatives

Alternatives analyzed in the Final Tiered EA include (1) the Proposed Action and (2) the No Action Alternative. The No Action alternative provides the basis for comparing the environmental consequences of the Proposed Action. Under the No Action Alternative, the FAA would not modify a license to SpaceX to allow for increased launch and landing cadence from the Boca Chica launch site. In

this situation, as permitted under existing licenses, SpaceX could conduct up to five annual Starship and up to five annual Starship/Super Heavy launches, up to ten annual Starship landings, and up to five annual Super Heavy landings. The Starship/Super Heavy launch vehicles would not be modified and would remain the same as assessed in the 2022 PEA.

Environmental Impacts

The potential environmental impacts of the Proposed Action and No Action Alternative were evaluated in the attached Final Tiered EA for each environmental impact category identified in FAA Order 1050.1F. Chapter 3 of the Final Tiered EA describes the affected environment and regulatory setting and identifies the environmental impact categories that are not analyzed in detail: Farmlands and Wild and Scenic Rivers. Chapter 3 of the Final Tiered EA also provides evaluations of the potential environmental consequences of the Proposed Action for each of the environmental impact categories and documents the finding that no significant environmental impacts would result from the Proposed Action. A summary of the documented findings for each impact category, including requisite findings with respect to relevant special purpose laws, regulations, and executive orders, is presented below.

- **Air Quality**, Final Tiered EA Section 3.2.1. Per FAA Order 1050.1F, air quality impacts are considered significant if the action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the Environmental Protection Agency under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations. Cameron County is designated as being in attainment for all criteria pollutants. Carbon monoxide (CO) and nitrogen oxide (NOx) missions would result from the increase in Starship/Super Heavy launches and landings, as well as from static test fires. The Proposed Action's total maximum estimated annual operation emissions are summarized by criteria pollutant in Final Tiered EA Table 3. Estimated emission rates for CO and NOx are below the EPA de minimis thresholds, with estimated rates of 45 and 98 tons per year of CO and NOx, respectively.

  During landing attempts, SpaceX anticipates that residual liquid oxygen (LOX) and methane will remain on Starship. Unlike other propellants, LOX and methane are not hazardous air pollutants, and any residual amounts will be vented to the atmosphere after landing.

  TCEQ received a complaint in April 2023 regarding concerns over health impacts due to particulate matter (dust) following the first Starship/Super Heavy launch. No notice of violation

or notice of enforcement issues were issued by TCEQ as a result of the complaint. SpaceX's installation and use of a reinforced launch pad capped with a steel plate and deluge water system have successfully suppressed dust and debris during subsequent launches and SpaceX is at this time unaware of any further complaints made to TCEQ by the public.

In addition, emissions of hazardous air pollutants from mobile sources (mobile source air toxics) would result from recovery equipment and vehicles over a widely dispersed area. Hazardous Air Pollutants from fossil fuel combustion are significantly lower than criteria pollutants and were not analyzed for mobile sources due to their minimal operations. The Federal Highway Administration deems projects with traffic below 140,000–150,000 vehicles per day to have low potential for mobile source air toxic effects, and the increase in truck traffic caused by the Proposed Action is well below this threshold.

Similar to the 2022 PEA, it is expected that airspace restrictions linked to the Proposed Action could lead to increased emissions from aircraft due to rerouting and greater fuel consumption. Any resulting aircraft departure delays from impacted airports would be of short duration. Consequently, any increase in emissions from aircraft kept on the ground would likely be insubstantial. Moreover, it is probable that grounded planes would not keep their engines running during anticipated delays, further reducing potential emissions. Hence, it is not anticipated that these increased emissions would be significant, and they would not surpass the NAAQS standards for any specific pollutants. Emissions from rerouted aircraft would take place above 3,000 feet (within the mixing layer) and are unlikely to influence the surrounding air quality.

The Proposed Action emission levels are well below the General Conformity Rule de minimis thresholds and would be expected to have little or no impact on regional air quality. A Conformity Evaluation is not required because Cameron County is not designated by the U.S. Environmental Protection Agency as a nonattainment area. Therefore, the Proposed Action would not result in significant impacts on air quality.

- **Climate**, Final Tiered EA Section 3.2.2. CO2e emissions would result from Starship/Super Heavy launches and landings, as well as from static test fires, methane venting, and truck traffic. Total CO2e emitted from the Proposed Action is estimated to be 97,342 metric tons, excluding the GHG emissions due to truck traffic, as these emissions would not result in meaningful increases in GHGs. Additionally, airspace closures would result in additional aircraft emissions from

increased fuel consumption during aircraft re-routing or departure delays. Increases in GHG emissions would result from the additional fuel usage. While rerouting would be a short-lived scenario for affected planes, the emissions from each launch, considering the number of planes impacted, would not be substantial enough to notably influence the climate.

In addition, climate change would not affect the Proposed Action or exacerbate any of the potential effects caused by the Proposed Action. Therefore, the Proposed Action is not expected to result in significant climate impacts.

- **Noise and Noise-Compatible Land Use**, Final Tiered EA Section 3.2.3. Noise impacts could result from static fire engine tests, launches, and landings. Updated noise modeling for Starship and Super Heavy static fire tests shows a slight increase in the L_{Amax} 90 dB contour (Starship from 2.5 to 3.5 miles, Super Heavy from 4 to 4.5 miles) and a reduction in the Sound Exposure Level (SEL) 90 dBA contour (Starship from 7 to 6 miles, Super Heavy from 10 to 8 miles) due to modeling improvements. Despite the modest expansion of higher noise areas, static fire tests remain intermittent and short in duration, and SpaceX proposes to further reduce licensed static fire time.

  Launch noise L_{Amax} contours (100–140 dBA) extend up to 8 miles from the launch site, affecting Port Isabel, South Padre Island, eastern Brownsville, Laguna Vista, and Tamaulipas, Mexico, with levels between 90–110 dBA. The 90-100 dBA SEL contours are anticipated to extend up to approximately 15 miles from the launch site. Although launch frequency will increase, launch noise events remain intermittent, temporary, and infrequent over the course of a year. No members of the public will experience noise above OSHA's 115 dBA threshold.

  Landing noise modeling shows Super Heavy landings would generate 90–100 dB L_{Amax} in southern Port Isabel and South Padre Island, with all other populated areas experiencing 90 dBA or below. Starship landings would have a 90 dB L_{Amax} contour extending about 6 miles from the VLA, with Port Isabel residents potentially hearing levels above 60 dB, particularly at night. The 115 dB L_{Amax} contour is 1 mile from the landing pad and does not include private residences. For a near-shore landing of Starship in the Gulf of America in a contingency landing zone beginning 1 nautical mile or more from the coast and covering a distance of up to 100 miles north of the VLA near Corpus Christi, and up to 100 miles south of the VLA near El Carrizo, Tamaulipas, Mexico, inland areas up to 5.5 miles from the coast may experience sound events between 90 - 115 dB.

Exposures from coastal landings would be brief (less than one minute), infrequent, and would not exceed OSHA hearing conservation thresholds.

Cumulatively (excluding sonic booms), the DNL 65 contour for the Proposed Action extends about 3.5 miles from the VLA, affecting only unpopulated areas except for Boca Chica Village. However, SpaceX would continue to enforce access restrictions during launches, ensuring that no residents or visitors are present in noise-sensitive areas within a 4-mile radius.

Updated sonic boom modeling for Super Heavy booster landings under the Proposed Action predicts overpressure levels up to 21 pounds/sq. ft. (psf) within the public hard checkpoint, an area restricted to SpaceX personnel during launches. Boca Chica Village, within this area, is evacuated during launch/landing activities. The predicted overpressure for the area surrounding the public hard checkpoint indicate overpressure events up to 15 psf, with contours extending just beyond the U.S. / Mexico Border.2 Predicted overpressure levels at the southern tip of South Padre Island and Port Isabel, Tarpon Bend, as well as northeast regions of Tamaulipas, Mexico would be expected to reach 10 psf. The 6 psf sonic boom contour is predicted to extend approximately 10 miles from the launchpad, and encompass portions of South Padre Island, all of Port Isabel, Laguna Heights, and portions of Laguna Vista. Portions of northeastern Tamaulipas, Mexico, including La Burrita and El Conchillal, would also be encompassed in the 6 psf sonic boom contour. The 4 psf boom contour is expected to extend approximately 15 miles from the launchpad, and would encompass northern portions of South Padre Island, Laguna Vista, eastern portions of Brownsville, and La Bartolina and El Huisachal in Tamaulipas, Mexico. The 2 psf sonic boom contour is predicted to extend approximately 27 miles, and would overlap Laguna Atascosa, Los Fresnos, Brownsville; and in Mexico, Matamoros and San José. The 1 psf sonic boom contour is predicted to extend approximately 28 miles, and would impact Rio Hondo, San Benito, as well as Santa Adelaida, La Venada, and San José in Mexico.

As described above, a Starship near-shore contingency landing zone in the Gulf, beginning 1 nautical mile or more from the coast and covering a distance of up to 100 miles north of the VLA near Corpus Christi, and up to 100 miles south of the VLA near El Carrizo, Tamaulipas, Mexico, is included in the Final Tiered EA. SpaceX may land the Starship vehicle anywhere within the revised boundary (Figure 2 in the Final Tiered EA). Onshore sonic boom impacts outside of the

[2] Because the FAA is required to analyze transboundary impacts, areas in Mexico are also considered in the analysis.

VLA Action Area were not previously considered in the 2022 PEA. The approximate extent of the 1 psf sonic boom contour associated with a near-shore landing of Starship in the Gulf (i.e., approximately 20 miles inland for a distance of approximately 100 miles north and south of the VLA Action Area) is the Starship Contingency Action Area. A sonic boom measurement of 1 psf is similar to a clap of thunder; significant impacts are not expected from sonic booms in the Starship Contingency Action Area.

For Starship landings at the VLA, the 2022 PEA predicted overpressure levels ranging from 1.2 to 2.2 psf. The 2.2 psf contour was estimated to be offshore and not impact land. Overpressures between 2 and 1 psf were predicted to impact the southern part of South Padre Island. For the Proposed Action, sonic booms are predicted to range between 4 psf and less than 1 psf. The 4 psf sonic boom is predicted to occur on southernmost part of South Padre Island and the jetty at Boca Chica Beach. The 2 psf contour is predicted to reach portions of South Padre Island, as well as Port Isabel, Boca Chica, and northeast portions of Tamaulipas, Mexico. The 1 psf contour is predicted to extend approximately 24 miles, and impact Brownsville, South Padre, Port Isabel, Laguna Heights, Laguna Vista, and other south Texas communities, as well as El Huisachal and Rancho Santa Isabel in Mexico.

The 60 dB C-weighted day-night average noise level (CDNL) contour extends approximately 5 miles from the VLA. No noise-sensitive areas are within the 60 dB CDNL contour, accordingly no noise-sensitive areas would experience significant noise impacts under the FAA's current 60 dB CDNL significance threshold.[3] Additionally, SpaceX will continue public notifications for launches and landings to reduce startle responses from high-noise events.

[3] The FAA determined that changes in transportation use, public expectations, and technology warrant a review of its civil aviation noise policy. On January 13, 2021, the FAA published in the Federal Register a notice entitled, "*Review of FAA Aircraft Noise Policy and Research Efforts: Request for Input on Research Activities to Inform Aircraft Noise Policy"*, 86 FR 2722, which described the FAA's noise research portfolio and a first of its kind nationally scoped survey that updated FAA's understanding of the dose-response relationship between exposure to aircraft noise and community annoyance (Neighborhood Environmental Survey or NES). FAA also requested input on the FAA's research activities that would inform the FAA's noise policy and would inform the future direction of the FAA noise research portfolio. The NES showed that a higher percentage of people were "highly annoyed" by aircraft noise across all levels of noise exposure that were studied. In addition to setting forth the FAA noise policy and research efforts, this Notice described the results of research into the societal benefits and costs of noise mitigation measures. On May 1, 2023, the FAA published in the Federal Register a notice entitled "*Request for Comments on the Federal Aviation Administration's Review of the Civil Aviation Noise Policy, Notice of Public Meeting.*" In this notice, the FAA announced that it intends to consider how changes to the FAA civil aviation noise policy may better inform agency decisions and the types of impacts FAA considers in making decisions (e.g., community annoyance, certain types of adverse health impacts highly correlated with aviation noise exposure). The FAA requested suggestions of potential improvements to how the FAA analyzes, explains, and presents changes in exposure to civil aviation noise. 88 FR 26641. In this notice, the FAA specifically sought public comments on whether it should establish noise thresholds for low-frequency events, such as those associated with the launch and reentry of commercial space transportation vehicles authorized by the FAA Office of Commercial Space Transportation, which metrics should be used to establish these noise thresholds, and the appropriate noise exposure level to define the threshold of significant noise impacts. As part of this policy review, FAA is also examining the body of scientific and economic literature to understand how aviation noise correlates with annoyance as well as environmental, economic, and health impacts. The FAA is also

There are no third-party structures in the 150-dB contour except for two historical resources that have been stabilized to protect the resources against vibrations. Boca Chica Village is within the 130 dBA L_{max} contour; Port Isabel, South Padre Island, Tamaulipas, Mexico, and parts of Laguna Vista fall within the 120 dB L_{max} contour; and Brownsville and most of Matamoros are within the 111 dBA L_{max} contour. For sonic booms, the probability of breakage is low. Booster landings may generate up to 21 psf, a level where window breakage becomes possible. FAA requires SpaceX to maintain insurance for potential structural damage claims, and property owners can submit claims directly with SpaceX.

Therefore, the Proposed Action is not expected to result in significant noise impacts.

- **Visual Effects (including Light Emissions)**[4], Final Tiered EA Section 3.2.4. The most impactful effect on visual resources from the Proposed Action would be associated with nighttime launches, which would result in increased light emissions. While the Proposed Action would increase the frequency of nighttime light emissions, improved vehicle preparation efficiency has reduced lighting per launch. SpaceX will continue mitigation measures under the Lighting Management Plan, including minimizing spotlights, directing light downward, and using amber lights. Therefore, the Proposed Action is not expected to result insignificant visual effects.
- **Historical, Architectural, Archeological, and Cultural Resources**[5], Final Tiered EA Section 3.2.5. In the PEA, the FAA made a finding of *adverse effect* for 17 historic properties within 10 miles of the VLA due to visual, auditory, and vibration effects or falling debris from an anomaly directly striking the historic properties that could diminish their integrity. To mitigate adverse effects, the FAA, SpaceX, and consulting agencies executed a Programmatic Agreement (PA) in April 2022, outlining minimization and mitigation measures such as vibration monitoring, noise reduction efforts, and restoration commitments in case of damage. Since then, vibration monitoring has confirmed no structural damage to key sites. Any vibration levels recorded were well within safe limits and comparable to background noise from traffic. Noise due to sonic booms from Super Heavy landings at the VLA would reach 21 psf, however, the sonic booms are not predicted to cause structural damage to cultural resources within the APE.

evaluating whether any of these impacts are statistically significant and the metrics that may be best suited to disclose them. Until this policy development process is concluded, the FAA will continue to rely on DNL to make decisions regarding the significance of potential noise impacts as set forth in FAA Order 1050.1F at Exhibit 4-1.

[4] Analyzed under Section 3.2.4, *Visual Resources*, of the Final Tiered EA.

[5] Analyzed under Section 3.2.5, *Cultural Resources*, of the Final Tiered EA.

SpaceX anticipates launching Starship/Super Heavy from Pad B and Orbital Launch Mount 2 (OLM 2) beginning in 2025. While no additional effects to cultural resources would result from the Proposed Action beyond those previously described in the 2022 PEA, SpaceX will monitor vibration levels at the Palmetto Piling, 1936 Centennial Marker, Palmetto and Cyprus Bridge Pilings site, the Port Isabel Lighthouse, and at locations 2 miles, 3 miles, and 8 miles from the launch site, as described in the Vibration Monitoring Plan for each of the first three launches from OLM 2.

To mitigate potential effects on cultural resources, the FAA has revised the EA to remove the U.S. Exclusive Economic Zone (EEZ) from the Pacific Ocean action area and establish a buffer zone around the Papahānaumokuākea Marine National Monument.6 The removal of the U.S. EEZ from the Pacific Ocean action area helps to ensure that operations avoid areas of cultural significance, such as World Heritage Sites.

Given the adverse effects are currently and will continue to be resolved through the Section 106 PA, the Proposed Action would not result in significant impacts on historical, architectural, archeological, or cultural resources.

- **Department of Transportation Act Section 4(f)**, Final Tiered EA Section 3.2.6. The 2022 PEA determined that there are 26 publicly owned parks, recreation areas, and refuges, and 17 historic properties within the 90 decibel (dB) Maximum A-Weighted Noise Level (L_{Amax}) noise contour for Starship/Super Heavy orbital launch operations. The Final Tiered EA determined that there are several additional publicly owned schools, parks, recreation areas, and refuges within the revised study area for the noise contours associated with the revised Starship landing area that is 1 nautical mile or more from the coast, and covering a distance of up to 100 miles north of the VLA, near Corpus Christi, and up to 100 miles south of the VLA, near El Carrizo, Tamaulipas, Mexico. The Proposed Action would not permanently incorporate any Section 4(f) properties or cause constructive use due to visual effects, access restrictions, noise, or vibrations. Although parts of the Laguna Atascosa National Wildlife Refuge and of the LRGV National Wildlife Refuge would be exposed to the 90 dB L_{Amax} contour, noise would be intermittent and short-term in duration, the proposed operations would not constitute a constructive use. However, temporary occupancy of some historic properties and Boca Chica

[6] Presidential Proclamation – Papahanaumokuakea Marine National Monument; Designated by Proclamation 8031 (June 15, 2006) and amended by Proclamation 8112 (February 28, 2007), and 50 CFR part 404 and Presidential Proclamation 9478 – Papahanaumokuakea Marine National Monument Expansion (August 31, 2016).

State Park and Brazos Island State Park could occur in the event of anomalies, though impacts are expected to be de minimis. The total duration of access restrictions would not exceed 500 hours annually, and noise effects, including sonic booms and traffic increases, would be intermittent and short-term in duration. No additional hours of anomaly-related access restrictions beyond the 300 analyzed in the 2022 PEA are proposed. The reliability of the vehicle would increase as more launches occur and the risk of an anomaly, including anomalies affecting adjacent properties, would be below what was described in the 2022 PEA. Any impacts would be short-term and not permanent. SpaceX would continue to implement the measures specified in the Memorandum of Agreement with TPWD described in the 2022 PEA to mitigate and restore any impacts from anomalies at Boca Chica State Park, Brazos Island State Park, and other TPWD land. SpaceX will also notify TGLO for any anomalies, as appropriate. The FAA has determined that the increase in operational activities would not lead to a corresponding increase in anomalies affecting the adjacent properties. Impacts resulting from anomalies would continue to constitute a temporary occupancy, but any such impacts are expected to be de minimis on Section 4(f) properties. As required by Section 4(f), the FAA received concurrence on this *de minimis* finding from the proper officials with jurisdiction over the affected properties.

SpaceX has implemented ongoing mitigation measures, including not restricting access on holidays and weekends during summer months, as required in the 2022 PEA, and relocating certain testing operations to Massey's Test Site, reducing the need for extended closures of Boca Chica Beach, collaboration with USFWS and Fishing's Future on environmental education, implementing the SpaceX Lighting Management Plan, and researching algal flat restoration in the area with Texas A&M University. The FAA and SpaceX continue to implement measures to minimize closure durations, including implementing precise scheduling to reduce public access disruptions, advance notice to allow for better planning around closures, and efforts to consolidate activities to minimize the frequency of closures. Additionally, SpaceX would continue to implement mitigation measures for access restrictions as described in the 2022 PEA. Additionally, SpaceX continues noise reduction efforts by using baffle boxes for generators and mufflers on equipment.

THC, TPWD, USFWS and TGLO concurred with the FAA Section 4(f) determinations. The Section 4(f) consultation letters for this Tiered EA are included in Appendix A of the Final Tiered EA.

Therefore, the Proposed Action would not result in significant impacts on Section 4(f) properties.

- **Water Resources**, Final Tiered EA Section 3.2.7. Potential impacts to water resources could result from deluge water discharges to protect the launch system, reduce fire risk, and suppress dust and debris. SpaceX discharges deluge water supplied by the Brownsville Public Utilities Board, with testing confirming compliance with Texas Multi-Sector General Permit effluent limits. However, prior unpermitted discharges led to enforcement actions by EPA and TCEQ, requiring SpaceX to obtain a Texas Pollutant Discharge Elimination System (TPDES) permit, which was applied for in July 2024. SpaceX has since entered compliance agreements with EPA and TCEQ, ensuring future discharges are authorized and monitored. The TCEQ issued the final industrial wastewater discharge permit to SpaceX on February 18, 2025.

  Water sampling from deluge discharges in 2024 confirmed no adverse environmental risks. SpaceX follows Clean Water Act requirements, has prepared a Spill Prevention, Control, and Countermeasures Plan and Hazardous Materials Management Plan, and continues to implement stormwater best management practices (BMPs) to minimize the potential for accidental releases of polluting substances from equipment. Steel plates with a water-cooling deluge system were installed on the launch pad to prevent damage, suppress fire and dust, and support booster landings at the VLA.

  Approximately 87,900 gallons of the approximately 422,000 gallons per operation (booster static fire, launch, or landing) may leave the paved area of the VLA per operation. However, this is expected to be less than significant in comparison to an average summer rainfall event and would be unlikely to alter the habitat or cause adverse alterations to water resources. Additionally, ablation from launch pad surfaces is captured in deluge water and retained onsite, with testing showing no significant contamination.

  Starship/Super Heavy is constructed primarily of stainless steel, which is non-toxic and inert. Other debris includes thermal heat tiles composed of silica that are highly resistant to degradation. The heat tiles are composed primarily of silica, with similar properties to glass, and are therefore inert and resistant to chemical or biodegradation. Heat tiles are expected to exhibit similar physical properties to glass, which is known to shatter or break apart into smaller pieces, with the sharp edges becoming rounded and smooth over time. Impacts on air quality or

water chemistry are not expected. It Starship/Super Heavy's propellants are liquid oxygen and liquid methane, which are not hazardous.

In the event that Super Heavy or Starship residual propellant ends up in the ocean, NMFS determined that any residual propellant reaching the ocean would evaporate or dilute quickly, with no measurable effect on marine species. SpaceX will continue monitoring and regulatory compliance under FAA, EPA, and TCEQ oversight. Following a Booster 7 (B7) test anomaly in July 2022, where oxygen was vented for safety, SpaceX installed an 83,000-gallon containment basin to prevent similar incidents. Due to the continued implementation of mitigation measures, no significant impacts to water resources are anticipated.

- **Biological Resources**, Final Tiered EA Section 3.2.8. Under the Proposed Action, Starship/Super Heavy launch operations would occur in the Boca Chica VLA in Cameron County, Texas, and landing and recovery operations would occur back on land at the VLA or on floating platforms or expended in the Gulf of America, Indian Ocean, or Pacific Ocean.

  Terrestrial Habitat and Wildlife

  Operational activities have potential to impact terrestrial habitats and wildlife due to the presence of structures, lighting, vehicle traffic and presence of humans, launch-related noise and vibration impacts, exhaust/heat plumes, and anomalies. The Proposed Action would increase annual truck traffic, but mitigation measures like employee shuttles and limiting water truck deliveries to daytime hours would help reduce traffic impacts to wildlife.

  Maximum noise levels generated from launches would extend 7 to 8 miles from the launch site. Launch noise lasts about 3 minutes, while landing engine noise is shorter and less noticeable. During launch activities, noise would cause wildlife to be temporarily displaced or disturbed. However, due to the temporary and intermittent nature of these noise sources, wildlife would be expected to resume normal behavior shortly after a launch operation is complete. Starship sonic booms are predicted to reach up to 4 psf, and Super Heavy sonic booms are predicted to reach up to 21 psf. Wildlife may experience a startle response, species-specific defensive behaviors, and orienting responses, but significant impacts to wildlife due to sonic booms are not anticipated. SpaceX would continue to conduct biological monitoring pre- and post-launch to evaluate avian species and vegetation changes due to SpaceX activities.

Heat plumes within a 0.6-mile radius of the launch pad could affect individual animals and vegetation, but past monitoring shows vegetation recovers within 1-2 growing seasons. Launch-related fires have occurred but are comparable to prescribed burns, with no observed significant wildlife mortality. New launch pad improvements have reduced debris dispersal, and recent test flights resulted in minimal vegetation impact. A newly identified "gravel plume" from engine thrust extends at least 0.3 miles and could damage shorebird eggs. SpaceX is implementing mitigation measures in collaboration with USFWS, including field experiments to assess the impact area, drone surveys for nest monitoring, and protective measures for active nests. SpaceX will also make an annual $5,000 contribution to the Gladys Porter Zoo for wildlife health research.

In accordance with ESA Section 7, the FAA reinitiated consultation with the USFWS on May 6, 2024. The FAA determined the Proposed Action may affect and is likely to adversely affect ESA-listed species and critical habitat under USFWS jurisdiction (See Table 6 of the Final Tiered EA). The USFWS Conference and Biological Opinion is included in Appendix A of the Final Tiered EA. Overall impacts on biological resources with the proposed mitigation measures, would not be expected to result in significant impacts on terrestrial habitats and wildlife.

Marine Resources

Potential stressors to marine species identified in the 2022 NMFS programmatic letter of concurrence (LOC) include falling debris, hazardous material exposure, sonic booms, ship strikes, and aircraft overflights.

Direct strikes by debris are extremely unlikely for all species of concern, fish, sea turtles, and marine mammals. This is due to the small size of the components as compared to the vast open ocean in addition to the low population density of marine life within the landing area. If debris from the vehicle struck an animal near the water's surface, the animal would be injured or killed. Additionally, there are no known interactions with any of these species after decades of similar rocket launches and reentries. Given the low frequency of the Starship/Super Heavy ocean descent and landing operations, and the fact that marine wildlife, marine mammals, and special status species spend the majority of their time submerged as opposed to on the surface, it is extremely unlikely that any adverse impacts from fallen objects would occur.

There may be residual propellent on board during splashdown, however a spacecraft's propellant storage is designed to retain residual propellant, so any propellant remaining in the

spacecraft is not expected to be released into the ocean. In an unlikely event the propellant tank ruptures on impact, the propellant would evaporate or be quickly diluted and buffered by seawater.

Sonic booms that would occur during descent and landing would intercept the ocean's surface. However, exceptionally little energy from in-air noise is transmitted into water. Due to the substantial attenuation of the sonic booms at the air/water interface and the exponential attenuation with water depth, sonic booms would not result in impacts on marine species beneath the surface. While ESA-listed marine mammals and sea turtles could be exposed to sonic boom overpressures when surfacing, the likelihood of this occurring is extremely low due to the brief duration of a sonic boom (less than one second).

Seabirds foraging near the launch site could be startled by engine noise, sonic booms, or recovery operations, but significant adverse effects are not expected. Some seabird species are attracted to artificial lights and may be drawn to illuminated landing platforms or droneships, increasing the risk of injury from heat and vapor plumes. However, the likelihood of significant impact is low due to the offshore location of these platforms. While birds resting or foraging near landing areas could be exposed to heat and vapor plumes, they are expected to flush before sustaining injury. The potential for overpressure events to impact black-capped petrels exists but is highly unlikely given the species' small foraging flocks and the vast size of the landing zones.

The FAA has conducted multiple consultations with NMFS regarding launch and reentry operations in marine environments for prior environmental documents evaluating Starship/Super Heavy, including locations in the Gulf of America, Pacific Ocean, and Indian Ocean (see Final Tiered EA Section 3.2.8.3 for specific consultation details). The 2023 and 2024 LOCs assessed Starship landings in the Pacific and Indian Oceans, respectively. NMFS determined that fewer than one ESA-listed marine species would likely be affected and concurred with the FAA that the Proposed Action may affect but is not likely to adversely affect ESA-listed species or critical habitats. NMFS reviewed SpaceX's Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization (IHA) application submitted May 16, 2024, and determined that the Proposed Action is not likely to result in the incidental take of marine mammals under NMFS's jurisdiction, and thus did not require an IHA.

The FAA determined the Proposed Action, specifically explosive events, may affect, and is likely to adversely affect two of the 24 ESA-listed species (Kemp's Ridley Turtle and Loggerhead Turtle – Northwest Atlantic Ocean DPS) and critical habitat under NMFS jurisdiction. For the other 22 ESA-listed species within the Project Area, the FAA determined that the Proposed Action may affect but not likely to adversely affect. NMFS issued a Conference and Biological Opinion (Appendix A of the Final Tiered EA). SpaceX will implement the Reasonable and Prudent Measures, and Terms and Conditions as noted in the Conference and Biological Opinion. Accordingly, consistent with the data and analyses LOCs and IHA, it is anticipated that the Proposed Action would not result in significant impacts to ESA-listed marine species and critical habitat.

Essential Fish Habitat

In the event of a failure, debris from the Starship/Super Heavy launch vehicle could fall into the ocean, but the vehicle would sink without causing permanent changes to water quality parameters such as temperature, salinity, or oxygen concentration. Minimal amounts of metals, propellant, or other substances would leach into the water, as the spacecraft's propellant storage is designed to contain residual fuel. In the unlikely event of a propellant tank rupture, the fuel would evaporate or quickly dilute in seawater and would not be expected to impact Essential Fish Habitat (EFH). Single-event impulse noise and sonic booms would not significantly impact EFH since little energy is transferred into the water column.

The FAA has revised the Proposed Action to remove the Pacific Ocean action area from the U.S. EEZ and establish a buffer zone around the Papahānaumokuākea Marine National Monument. These changes respond to public concerns and ensure that potential environmental impacts will not be significant by:

- Avoiding Sensitive Ecosystems: The removal of the Pacific Ocean action area from the Hawaiian EEZ ensures that operations avoid areas of the Pacific Ocean with unique biodiversity, thereby minimizing risks to marine life and ecosystems.
- Avoiding Overlap with Protected Areas: The establishment of a buffer zone around the monument ensures that activities remain at a safe distance from the boundary, reducing the likelihood of any adverse impacts on the marine environment.

- Mitigating Potential Cross-Boundary Impacts: By revising the action area, the likelihood of debris dispersion affecting the Hawaiian Islands and surrounding waters is significantly decreased and expected to be negligible.

Therefore, the increased launch frequency is not expected to result in significant impacts to EFH.

- **Land Use**, Final Tiered EA Section 3.2.9. Impacts to land use from launch-related operations were not anticipated because the Proposed Action would not violate any local land use plans or zoning ordinances, and the planned uses were deemed consistent with current land uses. Beach access restrictions would continue to follow the existing Memorandum of Agreement between Cameron County and TGLO, ensuring restrictions are implemented only when necessary for public safety. Restrictions would continue to be limited to 500 hours per year for operations plus 300 hours per year for anomalies.

  The transport of Starship/Super Heavy and payloads via SH4 and the Port of Brownsville may cause temporary delays on SH4, but it would be negligible compared to overall traffic volumes. SpaceX will continue public notifications via the Cameron County website and roadside message signs to minimize disruptions. There would be no changes to impacts on state-owned submerged lands or offshore oil and gas leases, and SpaceX would continue coordinating with leaseholders prior to launches and landings. Given the agreements and plans in place, the Proposed Action would not result in significant impacts related to land use.

- **Hazardous Materials, Solid Waste, and Pollution Prevention**, Final Tiered EA Section 3.2.10. Under the Proposed Action, hazardous materials transportation, storage, and disposal would continue to occur in a manner consistent with applicable federal, state, and local environmental, public, and occupational health and safety regulations. While transportation of hazardous materials such as LOX, methane, and liquid nitrogen will increase, spill prevention and response plans are in place to mitigate potential risks, including containment, reporting, and soil remediation if necessary. Propellant use will also increase, but most of it will be consumed during launch, and the likelihood of anomalies releasing hazardous materials is expected to decrease as vehicle reliability improves.

  Ablation from the pad flame deflector will be minimal, with sampling showing no significant contaminant accumulation, and monitoring will continue post-launch to ensure compliance. Solid waste will be salvaged or recycled where possible, with remaining waste disposed of in

permitted landfills. In the event of an anomaly, hazardous materials such as hydraulic fluid, propellant, or ordnance would either remain contained, ignite, or be transported back to SpaceX following DOT regulations. SpaceX will continue monitoring and implementing mitigation measures to ensure environmental protection. Therefore, the Proposed Action would not result in significant hazardous materials, solid waste, or pollution prevention impacts.

- **Natural Resources and Energy Supply**, Final Tiered EA Section 3.2.11.

  The Proposed Action would have minimal impact to the groundwater quality, and the demand placed on municipal water supplies would not be significant. While water use for launches would increase by 10.27 million gallons annually, this represents only 0.1% of the City of Brownsville's 2018 usage and remains well within capacity. Aquifer drawdown projections remain unchanged at 0.6 feet over 20 years. While the source of the water used in the deluge system is potable water trucked to Starbase from the BPUB, SpaceX's increased water usage accounts for 0.05% of BPUB's annual water delivery capacity. The FAA concludes that the deluge system will not have significant effects on the area's water supply.

  Electricity demand would remain manageable due to on-site solar power expansion and the newly installed Magic Valley Electric Coop power line. Increased diesel and gasoline demand would not impact regional supply. While annual propellant demand would rise to 168,750 MT, this represents only 1.1% of U.S. oxygen production and less than 0.01% of LNG exports annually. Given the large domestic markets for LOX and LCH4, this demand increase is unlikely to affect prices or availability.

  The Proposed Action would not cause demand to exceed available or future supplies of natural resources or energy. Therefore, the Proposed Action would not result in significant impacts on natural resources and energy supply.

- **Socioeconomics and Children's Environmental Health and Safety Risks**,[7] Final Tiered EA Section 3.2.12.

[7] On January 21, 2025, President Trump issued EO 14173, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity*. At that time, the NEPA process for this project was already underway, and FAA's Revised Draft Tiered EA reflected the expectation that this NEPA process would include analysis of environmental justice impacts. Due to the rescission of prior executive orders regarding environmental justice, and the recent action by the CEQ to rescind the NEPA implementing regulations, it is no longer the policy of the federal government to conduct environmental justice analysis, and it is no longer a legal requirement to do so. Any prior data gathering, analysis, or discussion regarding environmental justice is not relevant for purposes of evaluating the NEPA significance of this project, nor will it play any role in agency decision-making. As a result, the Final Tiered EA has removed the prior discussion of, and data/analysis related to, environmental justice.

Socioeconomics

Launch operations are expected to provide economic benefits, including increased labor demand, higher revenues for local businesses, and overall income growth. While low-income populations may not directly benefit from employment, they could see indirect economic stimulation from increased regional activity. A review of historic property values suggested no systematic decline due to proximity to the launch site. Airspace closures would not disrupt public airports or access. Additionally, SpaceX is contributing $15 million to Cameron County for natural and recreational improvements. The Proposed Action would not result in significant socioeconomic impacts.

Children's Environmental Health and Safety Risks

Fewer than five children live within a two-mile radius, and the nearest school, Ad Astra (a private school started by SpaceX), is within the 60 dB CDNL contour but remains closed during launch and landing activities. The nearest public school is 6 miles outside of the Project Area. As discussed in Noise and Noise-Compatible Land Use, increased noise would not cause impacts to human health. Safety risks from dust plumes to the nearby communities have been mitigated through launch pad modifications, and there would not be a material increase in traffic. Therefore, the Proposed Action would not result in significant impacts to children's environmental health and safety.

- **Coastal Resources**, Final Tiered EA Section 3.2.13. The Proposed Action complies with the Coastal Zone Management Act. The Texas General Land Office (TGLO) determined it does not require a consistency review under the Texas Coastal Management Plan since it is not a listed activity. To mitigate potential effects on marine ecosystems and cultural resources, the FAA has revised the Final Tiered EA to remove the US EEZ from the Pacific Ocean action area. This change ensures that operations avoid areas of unique biodiversity and cultural significance, such as World Heritage Sites, thereby minimizing risks to marine life and ecosystems associated with the monument. By shifting the action area, the likelihood of debris dispersion affecting the Hawaiian Islands and surrounding waters is significantly decreased and expected to be negligible. The Proposed Action includes downrange landings no closer than 1 nautical mile (nm) offshore and the jettison of the heat shield no closer than 1 nm offshore. SpaceX is proposing to expand the boundary of the Gulf portion of the landing zone action area to within 1 nm of the coast for a distance of 100 miles north and south of the VLA. SpaceX may land the Starship vehicle

anywhere within the revised boundary (Figure 2 of the Final Tiered EA). As there is no coastal construction or seafloor disturbance, no significant impacts to coastal resources would occur.

Please refer to Chapter 3 of the Final Tiered EA for a full discussion of the determination for each environmental impact category.

Chapter 4 of the Final Tiered EA provides an analysis of the potential reasonably foreseeable impacts in the context of past, present or future actions[8] resulting from the Proposed Action. The FAA has determined that the Proposed Action would not result in significant reasonably foreseeable impacts in the context of past, present or future actions in any environmental impact category.

Public Involvement

On November 20, 2024, the FAA published the revised draft EA on the FAA's website at https://www.faa.gov/space/stakeholder_engagement/spacex_starship, beginning the public comment period. The FAA provided a public notice of availability of the revised draft EA for public review and comment through local newspaper advertisements. The public comment period ended on January 17, 2025. The FAA held two in-person public meetings in Brownsville, Texas on January 7, 2025, and one virtual public meeting on January 13, 2025. The FAA received 12,303 comments on the draft EA and considered all public comments when preparing the Final Tiered EA. The FAA's responses to public comments are available in Appendix C of the Final Tiered EA. All public comments are available at https://www.regulations.gov/document/FAA-2024-2006-0114.

Conditions

Consistent with Paragraph 6-2.3(a) of FAA Order 1050.1F, the FAA shall take appropriate steps, through mechanisms such as the enforcement of licensing conditions and the establishment of monitoring protocol for said conditions, to ensure that SpaceX implements avoidance, minimization, and mitigation measures as set forth in Chapter 3 of the Final Tiered EA under the various impact categories, the ESA Section 7 NMFS Biological and Conference Opinions (NMFS BCO), and the ESA Section 7 USFWS

[8] Section 3.3 of the FAA's Draft Revised Tiered EA (Draft) refers to the impacts discussed in this section as "Cumulative Impacts." This term is used in CEQ's NEPA-implementing regulations. 40 CFR § 1508(i)(3) (2024). Since the publication of the Draft, however, CEQ issued an interim final rule to remove these regulations in accordance with E.O. 14154, Unleashing American Energy. See n. 1. As explained by CEQ in its February 19, 2025 memorandum, Implementation of the National Environmental Policy Act, NEPA, as amended, does not employ the term "cumulative effects" or "cumulative impacts." CEQ instead directs agencies to consider "'reasonably foreseeable' effects, regardless of whether or not those effects might be characterized as 'cumulative,'" consistent with NEPA. 42 U.S.C. § 4332(2)(C)(i). In accordance with this direction, the FAA has removed the term "cumulative effects" and "cumulative impacts" wherever previously used, but retains with edits the underlying analysis in Section 3.3 of the Draft Tiered EA.

Amended Biological and Conference Opinion (USFWS BCO). The NMFS BCO and USFWS BCO documentation is included in Appendix A of the Final Tiered EA. Avoidance, minimization, and mitigation measures identified in Final Tiered EA include:

Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, Ocean Waters)

New Measures

1. SpaceX is required to send the FAA copies of all monitoring data within 45 days of sampling the use of its deluge system.
2. SpaceX must notify the FAA Operational Safety Directorate, Commercial Space Transportation, Safety Assurance Division (ASA-300), within 15 calendar days of any changes to the representations in its license application or any document prepared or submitted by SpaceX, or its designee, on which the FAA relied to issue the vehicle operator license for Starship/Super Heavy operations at Boca Chica, TX; to support the FAA's compliance with the National Environmental Policy Act, 42 U.S.C. §§ 4321 et seq., as amended , 14 CFR § 450.47(a), and FAA Order 1050.1F, Environmental Impacts: Policies and Procedures; and to reach determinations that the proposed SpaceX licensed activities are consistent with applicable environmental requirements and will not significantly affect the quality of the human environment.
3. Notice required. If a Federal, State, or local environmental regulator alleges in an investigative report, administrative order, or notice of violation (notices) that SpaceX has violated an environmental requirement, standard, permit, or other authorization at the facilities or operations subject to an FAA-issued vehicle operator license for Starship/Super Heavy operations at Boca Chica, TX, SpaceX must provide the FAA with copies of any such notices within (i) the same time period that SpaceX is given to respond to such allegations by the relevant authority, or (ii) 15 calendar days, whichever is shorter. SpaceX must notify the FAA in writing immediately of actual or alleged violations of applicable Federal, State, or local environmental laws, regulations, permits or other authorizations relating to the license if a launch from Boca Chica, TX is scheduled within 15 days from the date on which SpaceX receives the notice.

   Contents of required notice. SpaceX must transmit the notice(s) to FAA and provide the following information in the required notice:

   - Nature of alleged or actual violation;

- The date on which SpaceX became aware of the alleged or actual violation;
- A summary of the actions SpaceX has taken or proposes to take to address or mitigate the violation; and
- Contact information for any agency involved in the investigation or enforcement action.

The FAA will not withhold, delay, or adversely consider license or license modification applications by SpaceX or otherwise take adverse action against SpaceX based on any notice SpaceX provides to the FAA hereunder prior to the final disposition of the underlying violation(s) of Federal State, or local environmental laws, regulations, permits, or other authorizations without first providing SpaceX with: 1) notice of the proposed adverse action; and 2) a reasonable opportunity to respond in writing.

4. Annual Certification. SpaceX must submit an annual certification, under penalty of perjury, signed by a responsible official, attesting to SpaceX's compliance with all applicable environmental laws, regulations, permits, or other authorizations related to FAA-licensed activities at Boca Chica, Texas.

Continued Measures

1. SpaceX must conduct its licensed activities in accordance with the representations made in its license application and must comply with all applicable Federal, Tribal, State, and local environmental laws, regulations, and standards in carrying out its license activities. SpaceX has a continuing duty to obtain and maintain current all applicable environmental permits, licenses, authorizations, and approvals for activities under this license.
2. SpaceX must continue to comply with or carry out, as appropriate, the conditions, limitations, mitigation measures, and monitoring plans set forth in any and all documents prepared by the FAA pursuant to the National Environmental Policy Act, appended to this license, and relied upon to reach a determination that the proposed licensed activities are consistent with applicable environmental requirements and will not significantly affect the quality of the human environment.
3. SpaceX must continue to comply with or carry out, as appropriate, the conditions, limitations, mitigation measures, and monitoring plans set forth in any and all documents prepared by the FAA pursuant to the National Environmental Policy Act, appended to this license, and relied upon to reach a determination that the proposed licensed activities are consistent with

applicable environmental requirements and will not significantly affect the quality of the human environment.

4. SpaceX would implement its SPCC Plan to minimize the potential for accidental releases of polluting substances.
5. In conjunction with final design and CWA permitting, SpaceX would submit a Notice of Intent to TCEQ for application of the general permit authorization for point source discharges of stormwater associated with industrial activity to surface water in the state. SpaceX would develop a SWPPP that would adhere to the permit effluent limitations and requirements applicable to the industrial activities.
6. If water treatment or retention is required, SpaceX would contain water in retention ponds. Retention ponds would be lined to prevent percolation of contaminants into the groundwater and would be maintained and monitored by SpaceX.
7. SpaceX would develop appropriate sampling protocols and water quality criteria in coordination with the TCEQ in accordance with Texas Surface Water Quality.
8. SpaceX would manage any deluge water according to state and local water quality requirements (e.g., pretreatment permits, NPDES permits, etc.).
9. SpaceX would adhere to proper marine vessel operating procedures and use of appropriate BMPs in the event of a recovery operation discharge or spill.
10. SpaceX would employ proper design redundancies of commodity storage facilities, containment around all hydraulic systems, safety measures in launch vehicle processes, and spill response and clean-up measures.
11. Pursuant to CWA Section 404, SpaceX would coordinate with the USACE to develop an appropriate compensatory mitigation plan for unavoidable impacts to wetlands.
12. SpaceX would coordinate with Cameron County floodplain administrators to obtain a development permit in accordance with the National Flood Insurance Program as well as county regulations.
13. Following an anomaly affecting adjacent properties, SpaceX would release the access restriction area west of the "All Hard Checkpoint" to allow visitors to continue to access the NHL and NWR while anomaly-response actions are taken. SpaceX would keep the "All Hard Checkpoint" in

place to protect public safety and implement the measures outlined in its Anomaly Response Plan.

14. Debris removal would occur by a method as determined by TPWD and agreed to by SpaceX.
15. In the event of an anomaly affecting adjacent properties, SpaceX must obtain a Special Use Permit on an emergency basis from USFWS as applicable, prior to clean-up activities on NWR fee-owned or managed lands.
16. Restoration measures regarding any adverse impacts to landforms include monitoring disturbed areas for spread of non-native vegetation and removal upon discovery, spreading seeds found locally from preferred grass species, and regrading disturbed land to its pre-existing condition. Alternative restoration approaches may be considered as determined by TPWD and agreed to by SpaceX.
17. Restoration actions with respect to algal flats include grooming of tracks with the use of hand tools and ambient soils to prevent further impacts, removing fill, establishing the proper slope within the tidal range, and inoculating the soils with a mixture of the dominant algal species, or any other approach as determined by TPWD and agreed to by SpaceX

Biological Resources

New Measures

2025 Amended USFWS BCO

Reasonable and Prudent Measures

1. The FAA and SpaceX must ensure that the Lighting Management Plan and the Biological Management Plan, including the 1) Avian Management Plan, 2) Vegetation Monitoring Plan and 3) Sea Turtle Plan, are sufficient to practicably minimize the impact of take (particularly for sea turtles and shorebirds) and are sufficient to address requirements for monitoring the impact of take with an increased launch cadence.
2. The FAA and SpaceX must continue to monitor for the surrogate metrics indicating incidental take of the adversely affected species and report findings to the Service on previously committed intervals (e.g., annually, quarterly) or upon detecting that amount of take has likely been met or exceeded.

3. The FAA and SpaceX will continue to work with the Service on solutions to improve the avian monitoring plan and to identify research needs and information gaps that could identify how piping plovers and red knots respond to launch and landing events.

Conservation Measures

1. SpaceX understands that the Service may make recommendations to modify one or more of the existing monitoring, management, or reporting plans related to the Starship-Super Heavy program at Boca Chica. This includes, but is not limited to, the vegetation, avian and sea turtle monitoring protocols contained in the Biological Monitoring Plan. These recommendations may be transmitted to SpaceX before or after completion of this reinitiation process. SpaceX commits to promptly engage with the Service to discuss any recommendations for changes to its monitoring or management plans and to implement recommendations that are practicable and that would likely result in the avoidance or minimization of impacts of incidental take authorized through the consultation process. SpaceX commits to responding to Service recommendations within 5 business days of receipt.
2. SpaceX commits to provide the Service and the FAA with a quarterly summary of licensed closure hours that are associated with the metrics for incidental take of piping plovers and red knots. The quarterly summary will include the date, start and end time, and duration of individual closure events and a comparison of the total annual duration of closures to date with the authorized annual limit.
3. SpaceX will review the locations of existing bollard and sign installation along State Highway 4 with the Service, and coordinate with the Service (as part of the existing annual reporting and coordination process) to identify remaining high priority locations for the installation of bollards and/or signage to help manage vehicle access to protected lands and wildlife habitats in the immediate vicinity of the VLA and Starbase. SpaceX commits to funding the installation of high priority bollards and signage within 12 months of completing the Addendum #2.

Terms and Conditions

1. Review the Lighting Management Plan with the Service by July 1, 2025, to determine whether additional light management measures are available to minimize light exposure on Boca Chica Beach that are consistent with the operational and safety needs of VLA operations. To the

extent that the Service, FAA, and SpaceX agree that such additional measures exist, begin implementing such measures.

2. Revise the Biological Monitoring Plan by July 1, 2025, to improve the collection of environmental, activity, and detectability covariate data for additional analysis with long- term piping plover and red knot count data for the purpose of improving analysis of trends and identifying the source of trends or variation in count data.

3. Revise the Biological Monitoring Plan by November 1, 2025, to add objectives and methods for investigating piping plover spatial use of wind tidal flats in piping plover critical habitat unit TX-01. The purpose of this monitoring is to gather data to help understand how piping plovers use critical habitat unit TX-01, such as where roosting occurs and how piping plovers move (or not) in response to launch activity and other environmental conditions. Begin this additional monitoring in November 2025.

4. SpaceX will use adaptive management to incorporate the results of the above listed revised Lighting Management Plan and Biological Monitoring Plan; will continue coordination with researchers familiar with study design involving short- and long-term ecological effects of noise, lighting and sonic booms, in the development or improvement of existing monitoring plans for the project; and will address the potential for compounding impacts of collective launches.

5. SpaceX will proactively coordinate with the Service annually to review the progress of the action and findings of monitoring. This will improve efficiencies for both the Service and FAA and promote the development of meaningful recommendations to avoid and minimize impacts to listed species.

Monitoring and Reporting Requirements

1. Reports will be submitted as outlined in the 2022 BCO, Addendum #1 to the 2022 BCO and the USFWS Flight 5 concurrence.

<u>2025 NMFS BCO</u>

Terms and Conditions

1. SpaceX shall provide the FAA information so the FAA shall continue to coordinate with NMFS to help inform future consultations on Starship-Super Heavy operations in the action area. Coordination should include review of Starship-Super Heavy fate reports and annual reports,

review of ESA section 7 reinitiation triggers (described in Section 12 of the BCO), and potential new measures to increase the effectiveness of mitigation and monitoring.

2. SpaceX shall provide the FAA information so the FAA shall monitor SpaceX and Starship-Super Heavy operations as licensed, and submit fate reports after each Starship-Super Heavy flight and annual reports to NMFS Office of Protected Resources ESA Interagency Cooperation Division.

3. SpaceX shall provide the FAA information so the FAA shall report any new information regarding the potential effects and ranges to effects used in our analysis of effects of explosive events on ESA-listed species.

4. SpaceX shall provide the FAA information so the FAA shall report to the NMFS Office of Protected Resources ESA Interagency Cooperation Division all observed injury or mortality of any ESA-listed species resulting from the proposed action within the action area.

5. SpaceX shall provide the FAA information so the FAA shall report to the NMFS Office of Protected Resources ESA Interagency Cooperation Division on impacts to ESA-listed Kemp's ridley and loggerhead sea turtles from explosive events. The report should be submitted no more than 30 days after each flight prior to reusability. This may be submitted with the fate report.

Continued Measures

<u>Flight 5 USFWS Concurrence</u>

Measures

1. SpaceX will conduct a review of the existing literature on impulsive noise effects of other non-domesticated shorebird species for purposes of comparison. SpaceX will deliver this review to the Service prior to the conclusion of consultation on Addendum #2 or as soon as possible.

2. SpaceX will monitor sonic boom levels during Flight 5 mission profile's Super Heavy booster landing. SpaceX will provide the monitoring data to the FAA within 15 days of the launch for review with other post-launch reporting. SpaceX will continue monitoring the Flight 5 mission profile flights if FAA deems necessary. The FAA will notify the Service if FAA discontinues monitoring.

3. SpaceX will collaborate with the Service and FAA to identify and prioritize a list of research studies that would help address data gaps regarding the effects of SpaceX launch activity on ESA-listed wildlife. SpaceX will also seek input on research priorities from scientists with expertise in avian acoustics and dispersal. SpaceX commits to initiating this measure prior to Flight 6 and delivering a completed research priority list to Service and FAA by April 1, 2025, or as soon as possible.

4. SpaceX will provide funds for a necropsy by a qualified professional (subject to Service approval) of any piping plover or red knot found dead within the 15 psf sonic boom overpressure contour. The purpose of the necropsy will be to determine if the bird exhibits indicators of hearing damage.

5. SpaceX will work with USFWS to develop field experiments to determine the extent of the gravel plume impact area due to Starship/Super Heavy launches. This will help inform the mitigation strategies. The goal of the experiments would be to determine the distance of the gravel plume and methods for protecting artificial nests during launch events. Methods would be agreed upon by USFWS.

6. SpaceX will monitor for impacts to nesting MBTA species through use of infrared drone surveillance. SpaceX commits to working with USFWS to develop a protocol to conduct pre-launch drone surveys in order to detect avian nests in open wind/tidal flat habitat south of the VLA, within the identified impact area. SpaceX would also perform a post-launch survey to evaluate identified nests in coordination with USFWS, TPWD, and/or a USFWS-approved biologist. SpaceX, or their contractor, would obtain necessary permits[9] as applicable. SpaceX would provide pre-and post-launch nesting bird reports to the FAA and USFWS within two weeks of each launch event taking place during the avian breeding season (February 15 through August 31).

7. SpaceX will work with USFWS to investigate field techniques to protect identified nests during launch events. Methods may include but are not limited to installation of temporary/removable sheltering objects around active nests to shield from the direct movement of gravel. If methods are deemed acceptable by USFWS, SpaceX would install protection measures at active nests prior to launches conducted during avian nesting season.

[9] Permits to be obtained from USFWS and/or TPWD.

8. SpaceX will make an annual contribution of $5,000 to the Animal Health Department at the Gladys Porter Zoo. The donation will be made within three months of the issuance of the October 2024 Written Re-Evaluation of the 2022 Final Programmatic Environmental Assessment for the SpaceX Starship/Super Heavy Launch Vehicle Program at the Boca Chica Launch Site in Cameron County, Texas, and by March 1 of each year thereafter, for the duration of the BO.

2022 USFWS BCO

Construction Measures

1. In conjunction with final design and CWA permitting, SpaceX will update its SWPPP to address the additional facilities proposed for the site and ensure compliance with its TCEQ stormwater permit. The updates will be completed before construction begins under the Proposed Action. The SWPPP identifies BMPs for erosion and sedimentation controls, including techniques to diffuse and slow the velocity of stormwater to reduce potential impacts (e.g., soil loss and sedimentation) to water quality during construction. All permitted construction activities with the potential to impact water quality from potential runoff from the site will be conducted in accordance with the stormwater permit, including measures identified in the SWPPP. SpaceX will provide a copy of the SWPPP for permitted construction activity under the Proposed Action to the FAA and USFWS before such construction begins and will provide the USFWS and FAA with written notice of updates to the SWPPP on a quarterly basis.
2. Prior to entry into or exit from unpaved areas of the VLA, SpaceX will ensure that heavy equipment (i.e., vehicles and machinery that are larger than a typical passenger truck) and vehicles to the maximum extent possible traverse over a construction shaker or rumble plates or rock bed located at the VLA to remove any sediment and dirt for purposes of preventing the introduction and spread of non-native plant species. SpaceX would inspect the equipment to ensure that hydraulic fittings are tight, hydraulic hoses are in good condition (and replaced if damaged), and there are no petroleum leaks. SpaceX will document the location(s) of the construction shakers or rumble plates installed at the VLA in its annual report to the USFWS.
3. SpaceX will implement a SPCC Plan. SpaceX will provide a copy of the SPCC Plan for permitted construction activity under the Proposed Action to the FAA and USFWS before such construction begins and will provide the USFWS and FAA with written notice of updates to the SPCC Plan on a quarterly basis.

4. SpaceX will not place excavated or fill material in delineated CWA Section 404 waters of the United States except as authorized by a permit from the USACE. SpaceX will ensure that discharged water associated with concrete mixing and placement activities does not reach surrounding water bodies or pools unless specifically authorized in a Department of Army permit. SpaceX will provide to the USACE written notice documenting completion of the activity authorized under Section 404 of the CWA; compliance with all associated terms and conditions; and implementation of any required compensatory mitigation for impacts to waters of the United States. SpaceX will provide the notice to USACE within 30 days of completion of the activities authorized by the USACE and will include a copy of this notification in its annual report to the USFWS.

5. SpaceX will continue contracting a qualified biologist to conduct pre-, during, and post-construction biological monitoring (vegetation and birds). This monitoring is ongoing and will continue to be conducted within 3 miles of construction areas. Monitoring reports will continue to be sent to the USFWS annually.

6. SpaceX will limit vehicle operation to existing paved and unpaved roads, parking areas, and authorized construction sites. Vehicle operators within the VLA will not exceed 25 miles per hour.

7. SpaceX would incorporate raptor protection measures into project design and any above-ground utility upgrades. For example, SpaceX would equip structures with devices to discourage nest building and perching (e.g., monopole technology and visual fright devices).

8. SpaceX will initiate coordination with the USFWS within 60 days of the start of construction under the Proposed Action to identify practicable opportunities to protect, restore, and/or enhance habitat for the ocelot, jaguarundi, piping plover, and/or red knot. SpaceX intends to continue coordination with the USFWS to complete one or more habitat protection, restoration, or enhancement projects to benefit the cats and the birds and contribute to the conservation of these species.

9. Within six months of the issuance the BO, SpaceX will coordinate with the USFWS, USACE, and TxDOT to determine the feasibility of constructing wildlife crossings along SH 4 west of the first public hard checkpoint to benefit the ocelot and jaguarundi. If a wildlife crossing is deemed feasible by each of the coordinating parties, pending regulatory or other approvals from

applicable agencies, SpaceX will fund the construction on one wildlife crossing west of the first public hard checkpoint within 1 year of the mutual determination of feasibility.

10. SpaceX will make an annual contribution of $5,000 to the Friends of Laguna Atascosa National Wildlife Refuge Adopt-an-Ocelot Program within 3 months of the issuance of the BO and by March 1 of each year thereafter for the duration of the BO. Funds donated to the program are intended to pay for:
    a. Wildlife guzzlers
    b. Camera trapping sets
    c. Special events to raise awareness about the ocelot
    d. Important supplies that allow biologist to monitor ocelot dispersal, behavior and habitat needs
11. SpaceX will make an annual contribution of $5,000 to the Peregrine Fund within 3 months of the issuance of the BO and by March 1 of each year thereafter for the duration of the BO. These funds will provide assistance with increased releases, repairing or replacing existing hack sites and/or nest boxes, or constructing new hack sites and/or nest boxes if falcons are observed in a new location.
12. If proposed construction activities under the Proposed Action occur during the avian breeding season (February 15 through August 31), a biologist will search the proposed areas of construction activities, including laydown areas, for nests (in shrubs and on the ground) one time no more than two days before the start of construction within the surveyed area. If the biologist finds an active nest, construction workers and activity, including the operation of vehicles, equipment, or tools, within 50 meters (164 feet) of the nest will be avoided until the biologist determines the nest is no longer in use. SpaceX will mark the avoidance zone with flagging, fencing, or similar signage within 24 hours of detecting the nest and will inspect the marking daily, repairing or replacing as needed, to ensure that it remains intact and visible through the duration of the nesting activity. SpaceX will document inspections and provide a summary of inspections and avoidance actions to the FAA and USFWS with the annual report.

Operational Measures

1. SpaceX will operate an employee shuttle between Brownsville and the project site and between parking areas at LLCC and the VLA to reduce the number of project-related vehicles traveling to and from the project site. SpaceX will encourage employees to use the shuttle by providing information on shuttle operation in new hire onboarding materials, routine staff communications (such as staff meetings), and in contractor environmental trainings. SpaceX will mandate use of the shuttle as practicable.

2. SpaceX will update its Lighting Management Plan to account for Starship/Super Heavy launches and related infrastructure that is the subject of the Proposed Action. These updates will be completed at least 30 days before the beginning of sea turtle nesting season that starts on March 15 of each year.

   Consistent with safety and security needs, SpaceX will initiate coordination with the USFWS and TPWD with the intent of incorporating the agencies' recommendations for minimizing lighting effects on ESA-listed species. This measure will minimize the modification of sea turtle habitat and minimize the likelihood of false crawls and disoriented hatchlings. Upon agreement with the USFWS and TPWD, SpaceX will implement the updated Lighting Management Plan. At a minimum, the plan will include:

   a. Directing, shielding, or positioning facility lighting to avoid or minimize visibility from the beach, minimize lateral light spread, and minimize uplighting without compromising safety and security of personnel.

   b. Turning off lights when not needed to maintain a safe and secure facility.

   c. Using low pressure sodium lights, to the extent practicable, during sea turtle nesting season. Limitations to the use of low-pressure sodium include the use of white lighting required for protection and safety of SpaceX personnel for ground support operations performed 24/7 throughout the year and the use of bright spotlighting during nighttime launch activities.

   d. Installing new lighting with multiple levels of control (i.e., some, all, or none of the lights can be turned on) so that lighting levels can be matched with specific activities.

e. Where lighting is not essential to safety or security of personnel, installing timers to switch lights off in the evening. Where applicable and not a threat to security, installing motion-detector switches.

3. SpaceX will continue contracting a qualified biologist to conduct pre- and post-launch biological monitoring (vegetation and birds). Monitoring will be conducted within 1 mile of the VLA up to a week before a Starship or Super Heavy launch and the day after the launch. Monitoring reports will be sent to the USFWS within two weeks following compilation and analysis of the data.

4. SpaceX will continue to collaborate with Sea Turtle, Inc. by supplying and storing field equipment and to provide sea turtle survey data within the action area to the USFWS annually. This measure supports activities that reduce the likelihood of death or injury to individual sea turtles.

5. Upon USFWS and SpaceX agreement of locations alongside SH 4 or other identified roads where the footprint is disturbed, SpaceX will fund the purchase of vehicle barrier materials to prevent trucks or ATVs from entering the NWR. The amount needed in any given year will be determined by NWR staff and is not to exceed $10,000 annually. SpaceX will install the barriers and USFWS staff will perform general maintenance and repairs of the barriers. Funds will be issued within 3 months from the issuance of the BO, and by March 1 of each year afterwards for the duration of the BO. SpaceX will be responsible for replacing or restoring damaged barriers caused by SpaceX personnel or an anomaly.

6. In coordination with NWR staff, SpaceX will develop a protocol (e.g., Access Restriction Notification Plan) providing as much advance notice as practicable to minimize disruption to refuge and land management activities.

7. SpaceX would coordinate with the USFWS to fund additional resources or projects to enforce the access restrictions required for launch operations.

8. SpaceX would implement any applicable avoidance or minimization measures included in the NMFS Letter of Concurrence when operating in the marine environment.

Environmental Worker Educational Briefings

1. SpaceX will develop educational training materials and submit to the USFWS for approval. Once approved, SpaceX will provide all on-site personnel, including staff and contractors, with an environmental worker education briefing(s) prior to the start of construction activities that will

include the following topics: species identification, instruction on implementing the conservation measures described in the BO, wildfire prevention measures, information regarding noxious or invasive weeds, requirements for safe handling and disposal of hazardous waste, proper disposal of litter and garbage, and the employee shuttle. SpaceX will also provide this environmental worker education briefing on an ongoing basis to all new hires of on-site staff and contractors before starting on-site work and will offer refresher briefings to all on-site staff and contractors on an annual basis. SpaceX will document completion of these educational briefings in its annual report to the USFWS.

Anomaly Measures

1. If an anomaly occurs affecting adjacent properties, prior to taking action to recover debris on land outside the VLA, SpaceX will notify the appropriate emergency personnel, land-managing agencies, and water regulatory authorities, as required. In addition, SpaceX will comply with the terms of the MOA between TPWD and SpaceX, including coordinating with TPWD and the USFWS prior to debris removal and clean-up and consulting with TPWD and/or the USFWS prior to any anomaly-response activity that may impact sensitive wildlife habitat.
2. In the event of an anomaly that creates debris on NWR fee-owned or managed lands, SpaceX would be required to obtain a Special Use Permit on an emergency basis from the USFWS, as applicable, for clean-up activities.
3. If an anomaly occurs affecting adjacent properties, SpaceX will comply with its Anomaly Response Plan, Security Plan, and Fire Mitigation and Response Plan, as applicable.

Essential Fish Habitat Conservation Recommendations

1. Prior to any in-water work (i.e., debris recovery or sinking), SpaceX will ensure all ballast and vessel hulls do not pose a risk of introducing new invasive species and that project implementation will not increase abundance of invasive species present at the project site. SpaceX will sanitize any equipment that has been previously used in an area known to contain invasive species prior to its use for project activities.
2. The FAA will coordinate with NMFS in the case of a launch failure and any vessel grounding to determine if consultation re-initiation is appropriate.

Terms and Conditions

1. The FAA will ensure that any license or permit to SpaceX related to the Proposed Action will include a condition that SpaceX implement all of the terms and conditions of the BO.

2. SpaceX will implement the conservation measures, many of which include related monitoring and reporting measures, described in the Proposed Action that address aspects of construction, operation, anomaly response, educational briefings, and other conservation measures and voluntary offsets. These measures minimize habitat modification, which can cause take via harm, for the ocelot, jaguarundi, northern aplomado falcon, piping plover, red knot, and/or sea turtles. These conservation measures require implementation, with updates as described, of certain facility and operational plans:

    a. Lighting Management Plan

    b. Fire Mitigation and Response Plan

    c. SPCC Plan

    d. SWPPP

    e. Anomaly Response Plan

    f. Access Restriction Notification Plan

    g. Site Security Plan

    h. Traffic Control Plan

    i. Biological Monitoring Plan

    SpaceX will provide the USFWS and FAA with written notice of updates to these plans on a quarterly basis.

3. SpaceX will conduct quarterly SH 4 clean-up efforts east of the first public hard checkpoint to reduce garbage and litter along the road. The clean-up efforts will take place within the SH 4 right-of-way. SpaceX will keep all vehicles used to support cleanups on designated roadways. SpaceX will report the dates of the cleanups in the annual monitoring report submitted to the USFWS. This measure minimizes the severity of habitat modifications (i.e., the presence of litter or garbage) that may attract animals that prey on or compete with northern aplomado falcons, piping plovers, red knots, or sea turtles. This measure also benefits ocelots and jaguarundis by

minimizing the likelihood or severity of increased prey concentrations along SH 4 that could lead to increased vehicle collision mortality.

4. SpaceX will ensure that staff and contractors place non-hazardous waste materials, litter, and other discarded materials, such as construction waste, on the VLA in containers until removed from the site. All trash containers will have predator-proof secured lids and be kept closed at all times and trash will be removed regularly. This measure minimizes the severity of habitat modifications (i.e., the presence of litter or garbage) that may attract animals that prey on or compete with northern aplomado falcons, piping plovers, red knots, or sea turtles. This measure also benefits ocelots and jaguarundis by minimizing the likelihood or severity of increased prey concentrations along SH 4 that could lead to increased vehicle collision mortality.
5. SpaceX will perform quarterly beach cleanups of Boca Chica Beach to reduce the likelihood of attracting predators (i.e., minimizing habitat modification) of the piping plover, red knot, and sea turtles to the beach. SpaceX will perform these beach cleanups for 1.5 miles north and south of the VLA. SpaceX will provide the opportunity for resource agencies (i.e., TGLO, USFWS) to participate and teach the community about the area's wildlife, sensitive areas, beach debris, and beach cleanup. SpaceX will report the dates of the cleanups in the annual monitoring report submitted to the USFWS.
6. SpaceX will coordinate with TxDOT to help ensure that the shoulders of SH 4 east of the first public hard checkpoint are maintained by regular mowing and trimming to keep vegetation shorter than 12 inches. SpaceX will notify TxDOT that maintenance may be warranted when vegetation along SH 4 exceeds approximately 9 inches. TxDOT will be responsible for performing roadway vegetation maintenance. This measure minimizes vegetation cover along SH 4 and minimizes the likelihood of vehicle collisions with ocelots or jaguarundis.
7. SpaceX will construct a barrier along the northern boundary of the VLA to assist in keeping debris from entering the NWR, help deflect off-gassing of liquid nitrogen, reduce sound transmission. Construction of the barrier wall will be completed prior to the start of launch operations. This measure will minimize the extent and severity of habitat modification for piping plovers and red knots that use areas adjacent to the VLA.
8. Cryogenic testing and other pressure tanks used under the Proposed Action will be tethered by cables when practicable to the VLA site to help prevent debris from leaving the VLA. This

measure will minimize the extent and severity of habitat modification for piping plovers and red knots that use areas adjacent to the VLA.

9. SpaceX will minimize noise from generators that may be used during construction and/or operations at the VLA under the Proposed Action. SpaceX will ensure that generators are placed within baffle boxes (a sound-resistant box that is placed over or around a generator), have an attached muffler, or use another noise-abatement method consistent with industry standards. This measure minimizes the severity of habitat modification for piping plovers and red knots that use areas adjacent to the VLA.

10. SpaceX will perform inspections of the lighting installed as part of the Proposed Action on a biweekly basis during the sea turtle nesting and hatching season (March 15 to October 1) to ensure that the minimization measures specified in the Lighting Management Plan are installed and in good working order. SpaceX will document compliance with the Lighting Management Plan and note any deviations. SpaceX will address deviations with the USFWS on a timely manner to implement corrective actions. SpaceX will report any deviations and responsive actions to the USFWS in its annual report. This measure minimizes the severity of habitat modification for sea turtles.

11. SpaceX will monitor nighttime light levels on the beach within 1.5 miles of the VLA at least once before the start of the sea turtle nesting season and biweekly during the sea turtle nesting and hatching season (March 15 to October 1). SpaceX will perform this monitoring at least once per year at a time when there is a launch vehicle at the VLA (i.e., a condition when more lighting at the site is needed for safety and security), even if this monitoring event occurs outside of the sea turtle nesting and hatching season. SpaceX will perform this monitoring between 9:00pm and 5:00am. SpaceX will use the information to identify any practicable opportunities for modifying lighting at the VLA (with updates to the Lighting Management Plan, as appropriate) that reduce light levels at the beach while maintaining operational needs for safety and security. SpaceX will document and summarize its monitoring and any responsive actions in the annual report to the USFWS. This measure minimizes the severity of habitat modification for sea turtles.

12. SpaceX will implement the water resources mitigation measures described in PEA Section 3.9.5. These measures address compliance with TCEQ TPDES permits, updates and/or implementation

of its SPCC Plan and SWPPPs, and development and implementation of associated water quality monitoring in coordination with TCEQ.

13. SpaceX will seek input from the USFWS on updates to its SWPPP prior to the start of construction activities under the proposed action. SpaceX will ensure that the updated SWPPP includes best practices appropriate to coastal ecosystems that minimize the transport of sediment and the discharge of freshwater runoff outside of the VLA and maximize the retention or infiltration of runoff within the VLA. This measure will minimize modification of habitat for piping plovers and red knots that use areas adjacent to the VLA (e.g., habitat modification resulting from discharges of sediment and freshwater runoff into the wind tidal flats adjacent to the VLA).
14. SpaceX will clearly demarcate the perimeter of all areas to be disturbed during construction activities under the Proposed Action using flagging or temporary construction fence and no disturbance outside that perimeter will be authorized. This measure minimizes the extent of habitat modification for the piping plover and red knot that use area adjacent to the VLA.
15. SpaceX shall use areas within the project boundary or other area subject to prior disturbance for staging, parking, and equipment storage in connection with the Proposed Action. This measure minimizes the extent of habitat modification for the piping plover and red knot that use area adjacent to the VLA.
16. SpaceX will obtain any gravel or topsoil needed during construction activities under the Proposed Action from existing developed or previously used sources, and not from undisturbed areas that provide habitat for the ocelot, jaguarundi, piping plover, or red knot. The measure minimizes the extent of habitat modification for ocelots, jaguarundis, piping plovers and red knots.
17. Consistent with TCEQ stormwater permit conditions, during construction activities associated with the Proposed Action, SpaceX will ensure that best practices are applied at the VLA that minimize the deposit of eroded materials outside the boundary of the VLA. This measure minimizes the severity of habitat modification for the piping plover and red knot (via deposit of materials that could alter the microtopography of adjacent flats) that use areas adjacent to the VLA.

18. In coordination with TxDOT and the USFWS, SpaceX will install five signs along SH 4 to inform the public on areas (such as sensitive areas of the NWR and the dunes) where they may not watch ongoing activities and launches. Signs would be installed within 6 months of issuance of the BO.

19. SpaceX will initiate coordination with TxDOT within 30 days of issuance of the BO regarding the installation of up to five additional wildlife crossing signs along SH 4 for a total of ten signs (five in each direction) to reduce the risk of collision mortality for ocelots and jaguarundis. SpaceX has already installed five wildlife crossing signs. Pending TxDOT approval, SpaceX will purchase and install the additional five signs. Installation of the signs will be completed within 6 months of issuance receiving TxDOT approval of the sign locations.

20. SpaceX security patrol vehicles or other necessary SpaceX vehicles on Boca Chica Beach will be driven above the "wet line" (i.e., the line on the beach where waves reach and repeatedly wet the sand at the time the driver passes by) and at a speed not to exceed 15 miles per hour. This measure minimizes the severity of habitat modification for piping plovers and red knots.

21. SpaceX will continue to implement the SpaceX Boca Chica Launch Site Biological Monitoring Plan to survey for sea turtles, birds, and vegetation changes. Monitoring reports will be included as part of the SpaceX's annual monitoring report submitted to the USFWS. After five years of monitoring, and when SpaceX applies for a renewal or extension of its license or permit, the USFWS, FAA, and SpaceX will evaluate the need to modify, adapt, or discontinue the monitoring. Sea turtle monitoring on Boca Chica Beach will be conducted prior to implementation of access restrictions and security sweeps for, and as soon as practicable after, suborbital and orbital launches. Post-launch monitoring can be conducted by Sea Turtle Inc.; however, the use of drones is acceptable if Sea Turtle Inc. is unable to conduct monitoring in-person. Findings will be included in the annual report to the USFWS.

22. SpaceX will continue to offer enhanced satellite monitoring via solar powered Starlink to the Peregrine Fund for continuous video coverage of northern aplomado falcon habitat to aid in biological monitoring.

23. If sea turtle nests are discovered prior to closure and security sweeps, SpaceX will coordinate with Sea Turtle Inc. to remove eggs prior to launch. Findings will be included in the annual report to the USFWS.

24. SpaceX will provide a dedicated space for Sea Turtle, Inc. volunteers on SpaceX property to monitor Boca Chica Beach use and to conduct pre-and post- launch surveys at Boca Chica Beach.

25. If SpaceX plans to conduct more than two of the ten annual launches under the Proposed Action at night during the sea turtle nesting and hatching season (March 15th – October 1st), SpaceX and the FAA will contact the USFWS within 30 days of the third nighttime launch (and any subsequent nighttime launches planned during that year) to discuss if there is a need for additional take authorization.

26. SpaceX will submit an annual monitoring report to the USFWS by March 1st for the preceding calendar year. The annual report will include monitoring results, measures implemented during project activities, success of such measures, incidences, and any recommendations on improvements to those measures. Reports should be sent to: U.S. Fish and Wildlife Service, Texas Coastal Ecological Services Field Office, ATTN: Field Supervisor, 4444 Corona, Suite 215, Corpus Christi, Texas 78411 or email to catrina_martin@fws.gov.

27. If the FAA issues SpaceX a vehicle operator license for Starship/Super Heavy launch operations at the Boca Chica Launch Site, the BO would expire concurrent with the expiration of the FAA's license. SpaceX will notify the USFWS if SpaceX plans to continue FAA-licensed activities (i.e., applying for license renewal or a new license) no later than 6 months before FAA's license expires. The FAA would conduct its consultation obligations as required under ESA Section 7 as part of its evaluation of SpaceX's license application.

Air Quality

Continued Measures

1. Periodic water spraying to control particulates and fugitive dust.
2. BMPs such as minimal idling of engines, watering of soils to be disturbed, and use of low volatility coatings.
3. Compliance with TCEQ's authorization under the Oil and Gas Standard Permit, including adherence to any permit conditions.

Noise and Noise-Compatible Land Use

Continued Measures

The FAA would ensure that SpaceX uses its notification plan to educate the public and announce when a launch or landing event would occur. Announcements of upcoming Starship/Super Heavy launches and landings would serve to warn people about these noise events and would likely help reduce human adverse reactions to these noise events. The plan would involve issuing statements to news outlets and law enforcement so that when noise is heard, the public would understand what has occurred. This approach is consistent with the public notification efforts conducted by SpaceX at Cape Canaveral Space Force Station and Vandenberg Space Force Base. While the overall impact of sonic booms would not be significant, SpaceX's advance public notice would help reduce human adverse reactions. SpaceX would be responsible for resolving any structural damage caused by a sonic boom.

Per FAA regulations and the Commercial Space Launch Act, SpaceX is required to carry insurance to cover claims by third parties that result from licensed activities, including any structural damage. The FAA requires that SpaceX carry insurance in the amount of the "Maximum Probable Loss," which is determined on a launch-by-launch basis by the FAA and is up to $500,000,000 per launch. In the event that structural damage results from noise-induced vibrations or sonic booms, any such claims of damage would be subject to the insurance policy terms and process specified by the Commercial Space Launch Act and FAA regulations.

Visual Effects (including Light Emissions)

Continued Measures

1. Management of Launch Site Lighting

    a. Exterior lights used expressly for safety or security purposes are limited to the minimum number and configuration required to achieve their functional roles.

    b. Minimization measures include directing, shielding, or positioning lighting to avoid visibility from the beach, minimize lateral light spread, and decrease uplighting; turning off lights when not needed; using low-pressure sodium to the extent practicable; installing lighting with multiple levels of control (i.e., some, all, or none of the lights can be turned on); and installing lighting timers where appropriate.

c. SpaceX will issue annual notices to all complex personnel prior to sea turtle nesting season reminding personnel of light use requirements and responsibilities.

2. Monitoring Launch Site Lighting

   a. To minimize lighting impacts to sea turtles, SpaceX will monitor its lighting. This monitoring will be conducted to verify SpaceX's compliance with the SpaceX Boca Chica Launch Site Lighting Management Plan.

   b. A qualified biologist will conduct lighting inspections to eliminate unnecessary lighting before nesting season and weekly during the nesting-hatching season (March 15th to October 1st) and send the results of the inspections to the FAA.

   c. SpaceX will conduct evening inspections between 9:00 p.m. and 5:00 a.m. monthly during sea turtle nesting season.

   d. Data from monitoring and unannounced inspections, as well as any compliance issues and remedies, will be summarized in SpaceX's annual monitoring report, per the requirements of the USFWS BO.

Historical, Architectural, Archeological, and Cultural Resources

New Measure

1. SpaceX will monitor vibration levels at the Palmetto Piling, 1936 Centennial Marker, Palmetto and Cyprus Bridge Pilings site, the Port Isabel Lighthouse, and at locations 2 miles, 3 miles, and 8 miles from the launch site, as described in the Vibration Monitoring Plan for each of the first three launches from OLM 2.

Continued Measures

1. Installing all utility lines between the LLCC and VLA underground to avoid visual effects to the NHL.
2. Preparing a historical context report (i.e., historical narrative) of the historic events and activities of the Mexican War (1846–1848) and the Civil War (1861–1865) that took place in the geographic area associated with and including the Area of Potential Effects (APE).
3. Funding the development and production of five interpretive signs (in English and Spanish) that describe the history and significance of the historic properties in the APE.

4. Funding educational outreach (i.e., webpage content for agency websites, informative videos) to the public about the region's cultural heritage.
5. Documenting the landscape of the Palmito Ranch Battlefield following the Level I Historic American Landscapes Survey standards and guidelines for nationally significant properties.
6. Implementing measures to reduce noise levels generated by construction equipment.
7. Implementing measures to minimize noise from truck (construction, tanker, concrete, water, delivery) traffic.
8. Conducting a vibration monitoring program to gather data on the effects of launches on the Palmetto Pilings Historical Marker, Palmetto Pilings, Port Isabel Lighthouse, and at the 2-, 3-, and 8-mile distances from the VLA. The program will also include a structural assessment from vibration data to assess any impacts and address any structural damage given any impact from launch operations.
9. Replicating and installing the missing stars and wreaths on the Palmetto Pilings Historical Marker.
10. Maintaining access restriction to the area west of the existing U.S. Customs and Border Protection checkpoint at a location east of where SH 1419 crosses SH 4 and west of where an unnamed north-south canal crosses SH 4, as generally depicted in PEA Appendix C, to include the entire extent of the NHL.
11. Placing temporary construction barriers around the Palmetto Pilings Historical Marker during construction.
12. If an anomaly affects a historic property subject to the PA, SpaceX will hire a qualified professional to make recommendations for restoration of the historic property. All work will be done following the Secretary of the Interior's Standards for the Treatment of Historic Properties. The proposed restoration will be subject to the review process described in PA Stipulation V. Upon review and approval, SpaceX will hire a qualified professional to restore the historic property.
13. In addition, an Unanticipated Discoveries Plan will be prepared to outline the processes to be followed when previously unknown cultural resources or human remains are discovered during construction or operation of the Proposed Action.

Department of Transportation Act, Section 4(f)

New Measure

1. SpaceX will notify TGLO for any anomalies, as appropriate.

Continued Measures

1. SpaceX would restore the SH 4 ROW to pre-disturbance conditions after installation of utilities.
2. In the event of an anomaly, SpaceX would notify TPWD, TGLO, and/or USFWS, as applicable, per the procedure outlined in SpaceX's Anomaly Response Plan.
3. Following an anomaly, SpaceX would release the access restriction area west of the "All Hard Checkpoint" to allow visitors to continue to access the NHL and NWR while anomaly-response actions are taken. SpaceX would keep the "All Hard Checkpoint" in place to protect public safety and implement the measures outlined in its Anomaly Response Plan.
4. SpaceX or a qualified contractor would conduct debris removal in accordance with a method as determined by TPWD and agreed to by SpaceX.
5. Restoration measures regarding any adverse impacts to landforms include monitoring disturbed areas for spread of non-native vegetation and removal upon discovery, spreading seeds found locally from preferred grass species, and regrading disturbed land to its pre-existing condition. Alternative restoration approaches may be considered as determined by TPWD and agreed to by SpaceX.
6. Restoration actions with respect to algal flats include grooming of tracks with the use of hand tools and ambient soils to prevent further impacts, removing fill, establishing the proper slope within the tidal range, and inoculating the soils with a mixture of the dominant algal species, or any other approach as determined by TPWD and agreed to by SpaceX.
7. SpaceX would implement the additional measures outlined in TPWD’s Section 4(f) concurrence letter, dated May 11, 2022, which include the following:
    a. Strict compliance with all terms and conditions of the MOA executed September 2, 2021, between TPWD and SpaceX.
    b. Completion and maintenance of bollard-and-cable traffic control fencing along SH 4 demarcating the boundaries of TPWD lands. SpaceX at its sole cost will survey the SH 4

boundary and will leave two or three gaps in the western portion of the fence only as necessary to provide reasonable access to privately owned inholdings at access points recorded in the real property records of Cameron County. Signage will be placed at each gap with contact information for legitimate landowners to gain access to their property.

c. SpaceX will take all necessary measures to make TPWD-owned lands at Boca Chica accessible to researchers and all TPWD and/or USFWS-authorized personnel at all times except during ignition events.

d. SpaceX will cover the cost of a contract with TPWD and/or Texas A&M Corpus Christi/Texas A&M system to develop specific protocols for test restoration of impacts to tidal/algal flats at Boca Chica resulting from the SN11 anomaly within 30 days of presentation of such a contract. The scope of the contract will include the cost of a principal investigator, one or two graduate students and all related equipment, materials, overhead, administrative, and publication costs.

e. In the event Texas A&M University is unable to provide the services outlined above, TPWD staff will work in good faith to identify another academic institution or similarly qualified third party to undertake the proposed project and will keep SpaceX staff apprised of its progress.

f. During the first "restoration season" as recommended by and following the study referenced in the preceding paragraphs, SpaceX, at its sole expense, will hire a qualified environmental firm to undertake a test restoration per the recommendations of the study, covering a minimum of five net acres of tidal/algal flats affected by the impacts of debris and debris retrieval following the SN11 anomaly. SpaceX will work cooperatively with TPWD to designate the specific footprint of the test restoration.

g. SpaceX, at its sole cost, will pay for monitoring the success of the test restoration relative to success criteria described in the protocols developed in the study. If no such protocols have been developed, success of the test restoration will be monitored relative to success criteria developed by the implementing environmental firm and agreed to by TPWD. A report on the progress of the restoration will be submitted to TPWD not less than 22 nor more than 26 months after implementation.

h. If the test restoration is determined to be successful, SpaceX, at its sole cost, will arrange the restoration of an additional 15 acres to be determined in consultation with TPWD and implemented no later than the restoration season following submission of the report referenced in paragraph #7.g above.

i. If the test restoration is determined to be unsuccessful, SpaceX, at its sole cost, will consult with the investigators and/or authors of the report referenced in paragraph #7.d and #7.e above and based on that input will repeat the measures in paragraphs #7.f, #7.g and #7.h above. These steps will be repeated until successful restoration of 20 acres is achieved. TPWD may waive this condition if it advises FAA in writing that all reasonable attempts to restore habitat result in more harm than good.

j. Once a successful restoration protocol is established, SpaceX will take steps to implement restoration of any new impacts that occur pursuant to activities permitted or licensed by the FAA immediately upon request by TPWD.

8. SpaceX would issue notifications prior to a planned access restriction and in accordance with its Access Restriction Notification Plan, including:

    a. Providing a forecast of planned access restrictions one to two weeks in advance of the access restriction on the County's website and/or send via email to the agency distribution list. Information about the proposed access restriction would be posted on Cameron County's website.

    b. Sending access restriction notifications to the regulatory and public land-managing agencies as plans finalize (typically 48 hours prior to the access restriction). The agencies would continue to receive updates immediately when the access restrictions go into place and when the access restrictions end, as well as cancellations of requested access restrictions. SpaceX personnel at the LLCC would send these notifications to ensure the most up-to-date information is distributed.

    c. Sending real time status and updates on access restrictions through a text message alert service. Subscribers can text "BEACH" TO 1-866-513-3475 to receive updates.

9. SpaceX would implement the following measures to limit access restrictions:

    a. No SH 4 access restrictions on the following holidays: Memorial Day, Labor Day, July 4th, Martin Luther King Jr. Day, Presidents' Day, Texas Independence Day, Cesar Chavez Day,

Emancipation Day in Texas (also referred to as Juneteenth), Veteran's Day, Good Friday, Easter, Father's Day, Mother's Day, Thanksgiving Day, Christmas Day, New Year's Day ("Holidays").

i. Where any of the Holidays falls annually on a Monday or Friday, no Weekend Access Restrictions, as defined in 9.d below, shall be permitted.

ii. Where any of the Holidays does not fall annually on a Monday or Friday but falls on a Monday or Friday in a particular year, no Weekend Access Restrictions, as defined in 9.d, shall be permitted for that year.

iii. For Thanksgiving, no access restrictions shall be permitted from Thanksgiving Day through the Sunday immediately following Thanksgiving.

b. Except as provided in 9.d, from Memorial Day to Labor Day (the times of greatest visitor beach uses and enjoyment), no Weekend Access Restrictions from Friday at 6:00 a.m. through Sunday. Road access restrictions for any SpaceX activities would occur from Monday through Friday at 6:00 a.m. This predictive schedule ensures the public access to all open areas of the NWR (e.g., Boca Chica Beach) from Friday at 6:00 a.m. through Sunday from Memorial Day through Labor Day.

c. Except as provided in 9.d, from the day after Labor Day to the day before Memorial Day (throughout the winter months), no Weekend Access Restrictions on Saturday or Sunday.

d. When a SpaceX activity requires at least one road access restriction between Fridays at 6:00 a.m. and Sundays from Memorial Day to Labor Day, or on weekends from the day after Labor Day to the day before Memorial Day, it is considered a "Weekend Access Restriction."

i. SpaceX may request a Weekend Access Restriction up to five times per calendar year.

e. For any SH 4 road access restriction, SpaceX will request, at least 48 hours prior to the start of the access restriction period, that the Cameron County Commissioners Court implement the access restriction. This notice requirement is intended to give the public a minimum 48-hour notice to reduce impacts to the recreational users. Any requested Weekend Access Restriction shall count toward the total five annual Weekend Access

Restrictions unless cancellation of the Weekend Access Restriction is publicized more than 24 hours prior to the start of the requested access restriction period.

f. Exception to the above is for activities deemed to be anomalies per FAA regulations.

10. SpaceX would implement measures identified in the Section 106 PA (see the list of measures below under *Historical, Architectural, Archeological, and Cultural Resources*).

11. SpaceX would implement the lighting mitigation measures from PEA Section 3.6.5 (see the list of measures below under *Visual Effects (including Light Emissions)*).

12. SpaceX would implement the insurance requirements noted in PEA Section 3.5.5, which require that SpaceX pay for any structural damage that may occur, thereby ensuring restoration and reducing the impact to a Section 4(f) resource (see below under *Noise and Noise-Compatible Land Use*).

In addition to the measures identified above, SpaceX would implement the following measures to mitigate impacts on recreational activities:

13. SpaceX would collaborate with TPWD and USFWS to meet USFWS fishing objectives for the region. To accomplish this goal, SpaceX would:

    a. Provide improved, enhanced, or new access for fishing opportunities in the Gulf of America, Rio Grande, Brownsville Shipping Channel, and/or South Bay. SpaceX will provide $5,000 annually to enhance the existing TPWD Tackle Loaner Program. This funding may be used to purchase fishing equipment (rods, reels, and tackle boxes with hooks, sinkers, and bobbers) for use at existing, heavily visited sites and/or allow the program to expand to new locations.

    b. Participate in fishing introduction and instruction opportunities on-site. SpaceX will provide the opportunity for Fishing's Future representatives to participate in the monthly beach cleanups and teach environmental stewardship and increase awareness for the protection, conservation, and restoration of aquatic natural resources.

14. SpaceX would collaborate with USFWS to meet wildlife observation, interpretation, and photography objectives for the area, as well as NHL priorities. To accomplish this goal, SpaceX would:

a. Coordinate with the USACE, TxDOT, and USFWS to explore the feasibility of constructing one safe pull off along SH 4, east of the first public hard checkpoint, or other roads adjacent to the NWR. At this location, which will be determined by USFWS in coordination with SpaceX, SpaceX will construct a wildlife viewing platform and associated signage; the signage will address the resident wildlife, NHL, and the SpaceX launch site.

b. Provide enhanced satellite monitoring via solar powered Starlink for remote wildlife viewing opportunities. Enhanced satellite monitoring will be provided at location(s) to be determined by USFWS, in coordination with SpaceX.

c. Participate in wildlife photography introduction and instruction opportunities on-site. SpaceX will provide the opportunity for wildlife photographers to instruct the public during the monthly beach cleanups and/or provide wildlife photography information and instructions at the wildlife viewing platform.

d. Provide improvements to the site interpretive message system along the SH 4 corridor east of the first public hard checkpoint. Locations and sign content will be determined by USFWS, in coordination with SpaceX. Improvements will also benefit NHL interpretation.

e. Participate in public event(s), such as the Coastal Expo, that focus on joint SpaceX, TPWD, USFWS, and NPS mission outreach. SpaceX will participate in one event annually.

15. SpaceX would collaborate with USFWS to meet environmental education objectives. To accomplish this goal, SpaceX will provide onsite Science, Technology, Engineering, and Math based learning opportunities. SpaceX will host regular site tours and one annual educational event for students in the Brownsville Independent School District. On the site tours, SpaceX will educate the students on the sensitive resources and habitat surrounding the SpaceX facilities. SpaceX would coordinate with the USFWS on the information to be shared relevant to the sensitive resources and habitat surrounding the SpaceX facilities. At the annual educational event, SpaceX will invite USFWS, TPWD, and NPS to speak to the importance of studying the Life and Physical Sciences.

Land Use

1. SpaceX would notify and coordinate with the oil and gas operators prior to any launch (including landing).
2. The measures listed above under *Department of Transportation Act Section 4(f)* would also mitigate land use impacts.

Hazardous Materials, Solid Waste, and Pollution Prevention

1. SpaceX would handle any release of a hazardous material according to the management procedures described in its Anomaly Response Plan.
2. SpaceX would comply with all applicable federal, state, and local rules and regulations pertaining to the proper storage, handling, and use of hazardous materials.
3. SpaceX would implement its SPCC Plan to prevent and address accidental spills or releases of hazardous materials.
4. SpaceX would report any release of a hazardous material in the Gulf of America through the U.S. Coast Guard National Response Center; releases in tidal waters would also be reported to TGLO.
5. SpaceX would comply with the International Convention for the Prevention of Pollution from Ships Annex IV and the CWA NPDES Program regarding vessel discharge of large commercial vessels for offshore landings on platforms.
6. SpaceX would implement the appropriate handling and management procedures for hazardous materials when venting residual LOX and LCH4.
7. Hazardous materials such as fuels, ordnance, chemicals, and payload components would be transported over public transportation routes to the appropriate facilities in accordance with DOT regulations.
8. SpaceX would treat or remove any soils adversely affected by spills in accordance with applicable federal and state regulations.
9. In the event of an anomaly, SpaceX would respond to all accidental releases of polluting substances quickly and implement appropriate clean-up measures in accordance with applicable laws to minimize impacts to the environment.

10. SpaceX would store solid wastes in covered receptacles until disposal to avoid offsite deposition, recycle solid wastes to the extent practicable, and dispose of the remaining solid waste in appropriately permitted landfills.
11. SpaceX would collect, store, and dispose of hazardous materials, substances, and wastes used and generated as part of recovery operations using practices that minimize the potential for accidental releases or contact with storm or marine water and in accordance with the Hazardous Materials and Emergency Response Plan, SWPPP, and SPCC Plan, as well as Resource Conservation and Recovery Act and Occupational Safety and Health Administration regulations.
12. SpaceX would assemble an emergency response team that would be responsible for responding to hazards and spills for all Starship/Super Heavy propellants.

Finding and Decision

The FAA decision in this Mitigated FONSI/ROD is based on a comparative examination of environmental impacts for each of the alternatives studied during the environmental review process. The Final Tiered EA discloses the potential environmental impacts for each of the alternatives and provides a full and fair discussion of those impacts. The FAA has determined that no significant impacts would occur as a result of the Proposed Action and, therefore, that preparation of an EIS is not warranted and no conservation measures beyond the ones identified by the Office of Commercial Space Transportation (AST) in the Final Tiered EA are required as a condition of approval, and a Mitigated FONSI/ROD in accordance with Paragraph 6-2.3(a) of FAA Order 1050.1F is appropriate.

The FAA believes the Proposed Action best fulfills the purpose and need identified in the 2022 PEA. In contract, the No Action Alternative fails to meet the purpose and need identified in the 2022 PEA. The FAA has determined that the Proposed Action is a reasonable, feasible, practicable, and prudent alternative for a federal decision in light of the established goals and objectives. An FAA decision to take the required actions and approvals in consistent with its statutory mission and policies supported by the findings and conclusions reflected in the environmental documentation and this Mitigated FONSI/ROD. After reviewing the Final Tiered EA and its related materials, the undersigned has carefully considered the FAA's goals and objectives in relation to various aspects of the launch activities described in the Final Tiered EA, including the purpose and need to be met, the alternative means of achieving them, the

environmental impacts of these alternatives, and the costs and benefits of achieving the stated purpose and need.

After careful and thorough consideration of the attached Final Tiered EA and the facts contained herein, the undersigned finds that the FAA's Federal Action is consistent with existing national environmental policies and objectives as set forth in Section 101(a) of NEPA and other applicable environmental requirements and will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(C) of NEPA. Therefore, the FAA will not prepare an EIS for this action.

The undersigned hereby directs that actions be taken, together with the necessary related and collateral action, to carry out the agency decisions as detained in this Mitigated FONSI/ROD, including:

- A determination under 14 CFR Part 450 as to SpaceX's application for a modification to their existing vehicle operator license.

APPROVED: DANIEL P MURRAY Digitally signed by DANIEL P MURRAY Date: 2025.04.24 13:54:02 -04'00' DATE: _____

Dan Murray
Executive Director, Office of Operational Safety

Right of Appeal

This Mitigated FONSI/ROD constitutes final order of the FAA Administrator and is subject to exclusive judicial review under 49 U.S.C. 46110 by the U.S. Circuit Court of Appeals for the District of Columbia or the U.S. Circuit Court of Appeals for the circuit in which the person contesting the decision resides or has its principal place of business. Any party having substantial interest in this order may apply for review of the decision by filling a petition for review in the appropriate United States Court of Appeals no later than 60 days after this order is issued in accordance with the provisions of 49 U.S.C. Section 46110.