



November 1, 2021

Ms. Stacy Zee, SpaceX PEA
c/o ICF
9300 Lee Highway
Fairfax, VA 22031
Email: SpaceXBocaChica@icf.com

Dear Ms. Zee,

The Lower Rio Grande Valley Group of the Sierra Club hereby submits the following comment regarding the Draft Programmatic Environmental Assessment for the Boca Chica Texas SpaceX Starship/Super Heavy Launch Vehicle Program (Draft PEA). This comment was drafted in coordination with the non-profit organization Save RGV, thus contains much of the same content as Save RGV's comment regarding the PEA, however, there may be differences. The Lower Rio Grande Valley Group is a local group of the Texas Lone Star Chapter of the national Sierra Club organization. Most members of the Lower Rio Grande Valley Group reside in the Rio Grande Valley in Cameron County and Hidalgo County.

NEED FOR AN EIS AND ACCOUNTING FOR ALL INFRASTRUCTURE, OPERATIONS, AND CUMULATIVE IMPACT (NOT JUST AN EA)

The FAA's NEPA procedures implementing the National Environmental Policy Act define when a Supplemental Environmental Impact Statement (EIS) is needed, or not. This was cited in the FAA's 2014 SpaceX EIS. [FAA Order 1050.1F, Section 9-2] "A Supplemental EIS is not needed if:

1. "The proposed Action conforms to plans or projects for which a prior EIS has been filed and there are no substantial changes in the Proposed Action that are relevant to environmental concerns."

SpaceX has in fact never launched a Falcon 9 or Falcon Heavy rocket from Boca Chica and now has no plans to do so. It has instead turned its site and activities into something unrecognizable in the original 2014 EIS and Record of Decision (ROD); a large and expanding complex to manufacture, fabricate, assemble and test the Starship and Super Heavy booster rocket in addition to producing fuel and power for the Starship and Super Heavy operations (e.g. power plant, gas extraction, gas delivery, gas treatment, gas liquefaction). The Starship and Super Heavy booster together will be larger than the approved Falcon 9 and Falcon Heavy by an order of magnitude, standing 39 stories tall, with 16 million lbs. of propellants, nearly 50% more than NASA's Saturn V rocket used to launch moon-landing missions. Round-the-clock experimental testing has already increased significantly. SpaceX has enlarged its footprint (and they plan to expand further) by increasing its acreage, its number of buildings, its number of employees and contractors, its hours of beach and refuge closure, and its number of static test firings and pressure tests. All these events significantly increase environmental impacts and none of them were analyzed in the original EIS.

Additionally, in the short time since SpaceX has conducted operations at the Boca Chica site, there have been multiple explosions that disrupted resident's lives, scattered fuel laden rocket debris and caused wildfires that have consumed more than 100 acres of sensitive native habitat on national wildlife refuge land. These serious impacts illustrate how critical it is for the FAA to initiate a new EIS process, and for federal regulators to exercise meaningful, legally required oversight.

2. "Data and analysis contained in the previous EIS are still substantially valid and there are no significant new circumstances or information relevant to environmental concerns and bearings on the Proposed Action or its impacts."

Most of the 2014 data and analysis is now not only invalid but wrong and misleading and significantly out of date by over seven years. The construction, testing and firing of the massive Starship and Super Heavy Booster will have much greater impacts than the rockets approved in the 2014 EIS. Because of the very substantial and significant changes to the

actions taking place at Boca Chica, virtually all the impact analysis in the 2014 EIS is now out of date and inaccurate. Specifically, new analysis needs to be prepared for the significant effects that are occurring, such as noise, light, frequency of events, fires and explosions, larger areas of direct and indirect impacts (most likely to include the towns of South Padre Island, Port Isabel, Long Island Village and the permitted but not yet built liquefied natural gas (LNG) export terminals on the Brownsville Ship Channel namely Texas LNG and Rio Grande LNG, and the proposed Jupiter MLP crude upgrader facility and off-shore VLCC loading terminals, the storage of much more highly volatile rocket propellant that is more explosive, has greater impacts to wildlife, wetlands, vegetation and endangered and threatened species, and increased denial of public access to marine recreation and Boca Chica beach.

Under economic impacts another issue is missing entirely. The latest license for the Starship tests requires \$198 million in third party liability, and federal indemnification for losses beyond that. This is higher than is required for any Falcon 9 or Falcon Heavy launch from Vandenberg AFB or Kennedy/Cape Canaveral, suggesting a far larger risk zone than was included in the FEIS or ROD. This probably doesn't include liability for the potential \$20 billion LNG terminals and LNG tankers that will likely be in the expanded risk zone, nor the proposed Centurion condensate upgrader facility with offshore export loading terminals. This list is by no means comprehensive.

3. "All pertinent conditions and requirements of the prior approval have, or will be, met in the current actions."

The FAA has done an inadequate job in ensuring SpaceX compliance with many of the conditions in its 2014 Record of Decision. One example is the closure of State Highway 4 and Boca Chica beach, which was to be limited to no more than 180 hours per year. Within the first six months of 2021, closures exceeded 225 hours, often with confusing and inadequate prior notifications and last-minute changes, cancellations and revocations. Nevertheless, SpaceX now wants to nearly triple its beach closure "quota" with no opportunity for public discussion and comment. To increasingly deny access to eight miles of public beach, state parkland and national wildlife refuge is a significant human impact and needs to be addressed, particularly as much of the experimental engine and rocket testing could be done at a safer and less public testing location elsewhere. Given the wholly

different purpose of the project, FAA, as part of the Supplemental EIS, needs to revisit the alternatives evaluation.

TIERED REVIEWS

All elements to SpaceX proposals (identified in 2-1 p. 9) are, according to SpaceX's purpose and need, essential to SpaceX's Starship/Super Heavy operations. However, in the PEA Section 2.1: Proposed Federal Action, it states, "*Detailed information about some of the launch-related infrastructure (e.g., exact location and design) is not currently available.*" Therefore, the draft PEA makes assumptions about these unknowns. It also states, "*The FAA may conduct environmental reviews of additional proposed launch and reentry sites if SpaceX further develops proposals. Such reviews may be tiered off this PEA as appropriate.*" The practice of FAA "tier reviews" that allows further SpaceX expansion is a loophole that avoids additional environmental review, project scrutiny, and public comment. This loophole of tiered analysis to avoid environmental reviews, has been used since 2014 and it violates the standards of NEPA. It is not a sustainable method of accountability. According to FAA's order 1050.1F, "NEPA compliance and other environmental responsibilities are integral components of that mission. The FAA is responsible for complying with the procedures and policies of NEPA and other environmental laws, regulations, and orders applicable to FAA actions." (p. 1-2).¹

The FAA should not "tier" reviews simply because information is not currently available from SpaceX. Due to the fact that elements like the power plant, gas treatment, and liquefaction are critical to the development and operations of the Starship and Super Heavy, all elements must be analyzed collectively as opposed to a tiered analysis. Launch/landing locations also need to be determined conclusively. An EIS is needed to determine, with specificity, all of SpaceX's plans and to accurately account for the cumulative impacts of all of SpaceX's proposals of the Starship/Super Heavy program in order to avoid, minimize, and mitigate impacts.

¹ https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf

INCREASED SCOPE & OPERATIONS

LAUNCH SITES

SpaceX has indicated it is considering additional launch (which includes landing for suborbital missions) and reentry locations for the Starship/Super Heavy program beyond the Boca Chica Launch Site. These launch and reentry locations are in addition to the VLA and should also be considered to be alternatives to launching/landing at the VLA. Thus, the platforms and launch locations should be fully analyzed and their impacts assessed prior to licensing. SpaceX has not planned or provided details of additional/alternative launch/reentry sites. Consequently, SpaceX is negligent in its responsibilities to avoid, minimize, and mitigate impacts of the Starship/Super Heavy program, which violates NEPA standards.

LAUNCH VEHICLE

PEA Section 2.1.2: Launch Vehicle. This overview appears to be lacking and inadequate per the FAA licensing code Title 14, Chapter III, Subchapter 3, Sections 450.43 Payload Review and Determination; and 450.45. Safety Review and Approval.

The Falcon rockets use the proven Merlin engine, which produces 0.63 MN (146,000 lb_f) of thrust. The Starship and Super Heavy use the unproven Raptor engine, which can produce approximately 2.3 MN (520,000 lb_f) of thrust. Thrust on lift-off for the Falcon Heavy is approximately 17.5 MN. Super Heavy, with all 37 engines, will have a maximum lift-off thrust of 74 meganewtons (MN).

Comparison between Falcon rockets and Starship rockets

	Falcon9	Falcon Heavy	Starship	Super Heavy
Weight (lbs)	1,100,000	3,400,000		
Thrust at Lift-off (KN)	5,844 KN	17,532 KN	12,000 KN	74,000 KN/
Thrust at Lift-off (Klbf)	1,314 Klbf	3,942 Klbf	2,700 Klbf	16,600 Klbf

To convert between metric units of thrust, kilonewtons, KN, and non metric units, kilopounds force, Klbf, an [online force unit converter](#) was used.

The Starship Super Heavy has over four times the thrust of the Falcon Heavy.

The Falcon rockets use RP-1 fuel (similar to jet fuel) and liquid oxygen. The Starship and Super Heavy Rockets use liquid methane and liquid oxygen.

These are very major changes from the 2014 EIS which was for 12 launches per year of the tested, approved, and reliable Falcon rocket (that was actually never even launched at Boca Chica per the 2014 EIS) to an experimental testing, launch and landing program for unapproved rockets. The Super Heavy, with over four times the launch thrust of the largest Falcon, will include expected explosions, twenty Starship launches per year, and fuel and oxidizer tank testing day and night with anticipated explosions once a month. Up to 300 hours of State Highway 4 road closures are anticipated to be required for debris removal from Boca Chica beach and neighboring wildlife refuges due to expected test failures and explosions. Such major changes are not a few tweaks to a running program that can be “tiered” on the EIS, but rather are entirely new programs that require an EIS.

These major changes and many others described in the PEA and discussed below demand the scrutiny of an EIS to make sure that the fragile ecosystems that support a massive variety of wildlife, some threatened and endangered, can thrive within the radically and more threatened habitat caused by their neighbor SpaceX.

PEA Section 1.1 Operational Activities, p.2-2 This section states, “In 2019 SpaceX developed the Starship technology as part of the reusable suborbital launch vehicle classification analyzed in the 2014 EIS.” However, the 2014 EIS only included a possible permit or license for Boca Chica suborbital launch vehicles smaller than Falcon 9. The Super Heavy violates that condition in the 2014 EIS.

A vehicle smaller than, or equal to, the Falcon 9 first stage would carry less fuel and produce equal or less noise and light at launch than the Falcon 9. Such a vehicle would create equal or less of a disturbance to wildlife, fauna and flora, than the Falcon 9 and therefore meet the environmental requisites of the 2014 EIS. It was designed and built for the Starship prototype, and tested outside of the requirements of the original EIS. Any significant environmental impact that will be made by a new addition to what was approved in the 2014 EIS requires a new EIS.

TANK TESTS

PEA Section 2.1.3.1: Tank Tests. *“SpaceX is proposing to conduct approximately 10 tank tests a month. SpaceX estimates a 10 percent rate of anomalies during tank testing. An anomaly would result in an explosion and the spread of debris.”* If SpaceX is expecting about 10 percent of tests will result in explosions, they are not anomalies. The definition of anomaly is “unexpected event.” Since one explosion is expected a month, will the noise, light, and debris from the explosion all be contained within the property line of SpaceX? If not, there is no reference in the section about discussions and sign-off by the interested parties who represent wildlife welfare and habitats. This may call for an EIS to bring the parties together. Furthermore, given the apparent lack of understanding of the outcome of the tests, it would be prudent for an EIS to be written. Additionally, this indicates additional closures not specified or calculated in the Draft closure proposal.

Section 2.1.3.1 inadequately factors in the cumulative noise, lights, debris, closures, and air quality impacts of the project.

DESALINATION PLANT

PEA Section 2.1.4.5 p. 31 Desalination Plant. A desalination plant will pump groundwater and inject the waste brine deep underground. The entire plan description for operating the plant is fewer than 200 words, even though it involves the “installation” of two 2950 deep reinjection wells. SpaceX indicates that it will extract water from two new wells and extract water at a rate of 40 gallons per minute (gpm) and inject brine into an injection well at a rate of 15 gpm. It is not indicated if water extraction is the amount for one or both wells. SpaceX also does not indicate how often these operations will occur, nor do they disclose the use of chemicals such as copper and chlorine that are often used in the desalination process. An EIS is needed to assess impacts of these operations including, but not limited to air emissions, water quality, aquifer impacts, sound, and light, in addition to avoiding, minimizing, and mitigating impacts.

NATURAL GAS PLANT

PEA Section 2.1.4.10 p32 The natural gas “pretreatment” plant for purifying the natural gas that will be used for rocket fuel and other plant needs is described in about 100 words. The power plant and liquefier are likewise very briefly described. SpaceX has not provided design plans, source of natural gas, source of gas delivery, pipeline locations (if using pipelines), or the amount of gas to be processed annually. With regard to pipelines to deliver gas, as reported by

Tech Crunch, SpaceX inquired about reusing a defunct natural gas pipeline running through the Lower Rio Grande Valley National Wildlife Refuge. However, that pipeline was permanently abandoned in 2016, according to the official and state records. The official told TechCrunch that the defunct pipeline now houses fiber optic cable for a University of Texas Rio Grande Valley internet connection.²

Details (e.g. location, emissions, design plans, visual impacts, etc.) of purification and liquefaction are not mentioned including, but not limited to, thermal oxidizers, heaters, flares, pipelines, and storage tanks. These elements will have impacts on environmental impact categories identified in the PEA, particularly regarding land use compatibility, air emissions, sound, visual effects, cultural resources, and biological resources. Lacking specificity, the emission total in Table 3-2 (p. 44) is not substantiated nor can it be verified. Without full disclosure of these proposals in an EIS, the impacts cannot be identified and assessed. Additionally, alternatives have not been evaluated.

POWER PLANT

PEA Section 2.1.4.7 Power Plant: The 250-megawatt power plant that will generate power for activities at all SpaceX facilities, including the VLA, would normally qualify as a major new source of air pollution under the Clean Air Act. Therefore, the impacts of this plant need to be fully disclosed, analyzed, and mitigated to properly comply with NEPA. Alternatives to this proposal are not identified. If it is for electricity, even hundreds of megawatts, the electricity can be provided by SpaceX's electricity provider using the new three phase electric line to be built for SpaceX. Additionally, the source of the natural gas to feed the natural gas turbines for the power plant is not identified. Sourcing of gas is an impact that is potentially significant, especially if it requires pipelines outside the region of influence or requires a route through environmentally protected areas.

ORBITAL LAUNCHES

PEA Section 2.1.3.4 Orbital Launches: There are several undetermined scenarios proposed by SpaceX, in regard to the exhaust plume. This is a new level of rocket energy discharge and needs a full EIS. SpaceX admits in Appendix G-Exhaust Plume Calculations (pp. 9-10) of the PEA that *“Due to the complexity of how the 31 engines are integrated into the base of the Super*

² <https://techcrunch.com/2021/10/08/the-mystery-of-elon-musks-missing-gas/>

Heavy vehicle, there is not a simplified method to directly predict the air entrainment and exhaust burnout chemistry for the installed engines. An extensive computational fluid dynamics (CFD) analysis would likely be needed to fully address the entrainment process.” This is an admitted unknown regarding a fundamental aspect of the entire program. An EIS would provide more confidence in the projections.

PEA Section 2.1.3.4: Orbital Launches. The Draft PEA references SpaceX’s launch manifest is still being developed at this time. To avoid, minimize, and mitigate impacts, a draft schedule is needed to provide the public, federal, state, and local agencies to identify any conflicts in wildlife biological cycles (e.g. migrations, breeding) to ensure that impacts to wildlife are minimized during critical life cycle stages.

PEA Section 2.1.3.4: Orbital Launches. SpaceX states, during unmanned orbital launches that require expending Super Heavy or Starship, that they would not attempt recovery unless they receive reports of large debris. Because SpaceX is claiming their project is needed to achieve National Space Policy goals, FAA and cooperating agencies should ensure that SpaceX be held accountable to National Space Policy goals, one of which is to *“create a safe, stable, secure, and sustainable environment for space activities, in collaboration with industry and international partners, through the development and promotion of responsible behaviors”*.³ FAA and NOAA must hold SpaceX accountable with regards to debris from intentional and unintentional consequences.

GROUND CLOSURES

PEA Section 2.1.3.5.1 Ground Closures: For purposes of commenting on the draft PEA, we believe the Texas General Land Office (GLO) recommendation, dated January 22, 2021, during the scoping period for the EA, best describes how closure hours should be calculated. *“An option is to count closure hours as the time State Highway 4 and Boca Chica Beach are publicly scheduled to be closed, unless notice of different hours or a cancellation is given at least 48 hours before the closure is scheduled to begin.”* The ongoing inconsistencies in process, notification, and exceedance of closure hours impede on operations of federal and state land managers, and other stakeholders, who support federal and state agencies in land and wildlife management. An alternative is that workers and contractors to the agencies responsible for the various wildlife refuges are provided with IDs by SpaceX to permit them entry to perform their

³ [National Space Policy of the United States of America. December 9, 2020. p5.](#)

tasks. Some contractors travel hundreds of miles for wildlife tasks, which they schedule for an open day, only to learn upon arriving that the highway to their work is closed on very short notice. Such an alternative would be a “good neighbor” gesture and lessen the impact of road closures out of their control.

SODAR

Section 2.1.3: Operations. This mentions SODAR (sonic detection and ranging), which operates 24/7 and “sends out a short sonic pulse every 15 minutes that can reach 92 decibels (dB) at the source...” This was omitted from the noise impacts section and needs to be addressed as it relates to cumulative impacts on beachgoers, and wildlife. This, along with the continuous lighting, increases the possibility or probability of this area being unsuitable to humans for recreation and unsuitable and discouraging, (if not fatal) to wildlife for their survival.

SAFETY, HEALTH & CLIMATE

NEED OF A LAUNCH FAILURE ANALYSIS

The draft PEA does not address the significant concern voiced in the January 22, 2021 FAA public scoping comments regarding the need for a *launch failure analysis* (PEA p. 6) Commenters pointed out the proximity of two LNG facilities (Rio Grande LNG and Texas LNG) at the Port of Brownsville that have been in process prior to SpaceX’s Starship/Super Heavy activity. The Department of Interior commented on the 2017 Written Re-Evaluation stating, “*the construction of the Stargate Building and the three proposed Liquefied Natural Gas Terminals at the Port of Brownsville that have filed for a FERC permit constitutes significant new circumstances and/or information that is relevant to evaluating the cumulative effects of the expanded SpaceX project.*” The response in the Written Re-Evaluation stated, “*The FAA disagrees with the NPS. The Stargate building and Port of Brownsville LNG facility were analyzed in the cumulative impacts chapter of the 2014 EIS. The additional infrastructure SpaceX is proposing to construct in largely the same footprint that was analyzed in the EIS does not substantially change the cumulative impacts analysis in the EIS.*” This was an inaccurate statement. An analysis on the impact to Rio Grande LNG and Texas LNG still remains to be analyzed by the FAA and/or the Federal Energy Regulatory Commission. The 2014 EIS referenced only one LNG project, Gulf Coast LNG Export LLC.

Additionally, a cumulative analysis and launch failure analysis must also include Centurion's/Jupiter MLP's proposed crude upgrading, processing, and export facility that includes marine loading berths 6 miles off shore for the loading of barges and VLCC ships (65,000dwt Panamax sized) at 30,000 barrels per hour. The FAA and SpaceX, in the interest of public safety, must account for worst case scenarios when Starship/Super Heavy explodes during launches and landings. According to the PEA, such "anomalies" are expected (and in fact have already occurred). Without a launch failure analysis, the Port of Brownsville, Port Isabel, South Padre Island, and Long Island Village, as well as the immediately adjacent wildlife refuges and state parks, cannot adequately plan for emergencies. A launch failure analysis is also needed to determine the impacts to the surrounding environment and wildlife.

The Anomaly Response Plan that addresses road closures, based on the prediction of one anomaly per month, assumes that 300 hours/year (PEA p. 9), or 25 hours per anomaly, will be sufficient to clean up the area. Considering the amount of time that it took to clear the March 30, 2021, explosion that involved three Raptor engines, this is likely an underestimation of the time that roads and the beach will have to be closed for anomalies. This is in violation of the Code of Federal Regulations 450.110 Physical Containment, and 450.133 Flight Hazard Area Analysis. Additionally, the definition of the word anomaly is "something that deviates from what is standard, normal, or expected." It is therefore misleading to use the word anomaly to describe potential launch failures, operational failures or explosions that are expected during testing.

AIR QUALITY/CLIMATE

The Draft PEA does not include the cumulative amount of Green House Gasses (GHG) emissions from auxiliary infrastructure and operations. It should include the total emissions from all proposed launches, landings, testing, as well as emissions from construction, methane venting, the natural gas pretreatment system, the power plant, the desalination plant, vehicular traffic, and road maintenance. These contributing emissions are significant. Consequently, the PEA's greenhouse gas/global warming analysis is inadequate. If one day of the 2018 US total GHG emissions is compared to (their estimate of) the annual SpaceX operations, the SpaceX annual is 0.34%. (PEA Table 3-3. Estimated Carbon Dioxide Equivalent Emissions Comparison).

It should be noted that Port Isabel Junior High is just over six miles away (PEA p. 137). Children's proximity to the SpaceX complex is glossed over in Section 3.15.3.3. A full EIS would

give a more complete analysis of air quality issues for children and others with compromised health issues as well as the cumulative effects of pollutants that tend to be present in areas with lower economic opportunities.

ENVIRONMENTAL JUSTICE & SOCIOECONOMICS

BEACH ACCESS

PEA Section 3.15.4.2 Closing Boca Chica Beach is an environmental justice issue. With a population of 186,738, the 2020 census reports Brownsville residents are 95.2% Hispanic and other minorities. The median income in 2019 dollars was \$38,588, with a poverty rate of 29.3%. For many Hispanic and low-income residents of Brownsville, Boca Chica is “their” beach, as it is closer than the beaches on South Padre Island. It is easily accessible, except for the closure hours, and especially in the summer months and during holiday weekends, when traffic to/from South Padre Island routinely backs-up on State Hwy 48 and State Hwy 100. And most importantly to a low-income community, entrance to Boca Chica Beach is free compared to \$14 (March-Sept., off season \$12) per daily visit to Cameron County Beach Access 5, which allows drive-on visits and best replicates the natural beach experience at Boca Chica. Cameron County Beach Access 6 is free off-season, but requires use of a 4x4 vehicle which is not an available or affordable option for many. The other free SPI Beach Access points located behind the beachfront hotels, are not drive-on beaches and are much more challenging (in-season parking availability near access points is very, very limited) for day visitors. The approximate driving time from Brownsville to Beach Access 5 is approximately 50 minutes during the off-season and at times when there are no traffic back-ups. When traffic backs-up, driving time for the trip could extend to approximately 2.5-3 hours. The conclusion that there are other cost-free public beach access locations within the vicinity of local communities does not accurately and appropriately consider the actual logistics involved in getting to the other beach locations, especially for a low-income minority community. The PEA lists 500 closure hours for launches and tests and an additional 300 closure hours for the clean up of anomalies (predicted to be one per month). Using this plan, the beach will be closed a considerable number of partial days, making the number of days that this Brownsville minority group of residents will be denied beach access very high. Therefore, the proposed action, which includes the closing of State Hwy 4 and Boca Chica Beach, would result in disproportionately high and adverse impacts to

lower income indigenous populations who for generations have relied on access to the waters for economic and familial subsistence.

IMPACT ON INFRASTRUCTURE

The Draft PEA (PEA Section 3.5, p. 52) authors admit there is structural damage potential due to orbital launch events and predicts the percent of the people from South Padre Island, Laguna Vista, and Tamaulipas, Mexico who will likely file a damage complaint: *KBR assessed the potential for structural damage due to orbital launch events using the potential for structural damage claims. An applicable study of structural damage claims from rocket static firing tests indicates that, based on Maximum Unweighted Sound Level (Lmax), approximately one damage claim will result per 100 households exposed at 120 dB and one damage claim per 1,000 households exposed at 111 dB (Guest and Slone 1972).* SpaceX does not, however, address possible damage to current and proposed infrastructure at the Port of Brownsville and the Brownsville Channel as is required in Code of Federal Regulations § 450.110 Physical containment. Sonic booms, in particular from Super Heavy landings will cause structural damage: *Predicted overpressure levels for a Super Heavy landing range from 2.5 psf to 15 psf. Brazos Island State Park, Boca Chica Bay, Boca Chica State Park, portions of the NWR, Boca Chica Village, and Tamaulipas, Mexico would experience levels up to 15 psf. Boca Chica Beach and the southern tip of South Padre Island are within the 6.0 psf contour. South Padre Island, including residences, Port Isabel, and the Port of Brownsville ship channel are included in the 4.0 psf contour (PEA p. 57).* These psf values cause “regular failures” of glass and plaster at the least, and damage to sinks, roofs, walls and water pipes at the higher levels (PEA pp. 58-9). Significantly, the single bridge from Port Isabel to South Padre Island is not mentioned in the noise damage (long and short term) assessment in Appendix B.

LOCATION

Section 2.1.1: Location only mentions distances from the Launch and Loading Control Center (LLCC) and the Vertical Launch Area (VLA) to Mexico, which are only 1.3 miles and 2.2 miles respectively. Full analysis of distances to closest points of populated land, (e.g. Matamoros, City of South Padre, Port Isabel, Long Island Village, Laguna Vista, Port of Brownsville), as well as South Bay Coastal Preserve is necessary information. Other necessary information is the distance to the causeway-- most importantly the highest point of the causeway, as well as data

on cumulative vibrational impacts over time from launch, reentry and/or sonic booms and anomalies (explosions). This data should include projected model trajectories of debris to any portion of the causeway, drawbridges, and the ship channel.

ECONOMICS

PEA Section 1.3: One of the purposes of this project is mentioned as benefiting the public interest, yet this entire section only cites U.S. Government goals of space travel and “commercial customers.” As this is taxpayer funded, the vague term *commercial customers* needs clarification. It further states that the goal is to encourage private sector activities through the cost effective delivery of cargo to the moon and Mars. A discussion of the scope of the private sector activities, identification of types of commercial customers, and project cost effectiveness is necessary.

PEA Section 1.4: Public Involvement. (PEA p. 6) There were twice as many negative concerns (than positive) that covered issues of environmental justice, social justice, public safety, constitutional rights, and cultural impacts. The positive comments were potential for jobs and economic gain, innovation in space technology and ideal southerly location. Employment data that shows fully what is or has been the economic and job growth to date, and more importantly, from the local labor force is needed, in addition to realistic projections for economic benefit to the area when costs are factored in.

Airport closures: According to the document (PEA pp. 23-4), there is the possibility of airport closures. Is Brownsville ready to relinquish control of its flight schedule to an outside company? Will airlines want to relocate here (to our newly expanded airport) if they know that SpaceX can mandate an airway closure and idle planes, or force flight cancellations?

PEA Section 2.1.3.5.1: SpaceX identifies that the Brownsville Shipping Channel would be temporarily restricted during launches. SpaceX does not provide an estimate on the amount of time of restrictions of activity in the shipping channel. If the shipping channel restrictions undergo a similar process and procedure to what has occurred with road closures (e.g. last minute cancellations, rescheduling, etc.), potential economic impact could result. An EIS is needed to identify the cumulative socioeconomic impact on the businesses (current and proposed) and operations at the Port and the Channel, and other economies such as charter fishing operations, and commercial fishing operations as well as tour boat operations,

recreational fishing and all recreational, commercial and science research activities conducted in the bodies of water that are adjacent to and/or are enjoined by the channel.

Additionally, a cumulative analysis of socioeconomic impacts in a new EIS is needed to assess the impacts on:

- 3.14.4.1:Energy Supply and Consumption: SpaceX has not demonstrated they can source their own natural gas, let alone in enough quantities for their operations and in the time period of which they will operate at Boca Chica. SpaceX has not defined the total amount of natural gas they will use for their cumulative operations. It is more plausible that SpaceX will require the sourcing of gas via a pipeline connection or use of their own pipeline from Eagle Ford Shale region or elsewhere. An EIS is needed with a full disclosure of the amount of resources used to examine socioeconomic impacts.
- An EIS is needed to examine the number of new employees, available housing, the impact to the housing market, gentrification, and the pricing out of low income residents from housing and neighborhoods. Gentrification and pricing out of low income residents has been identified by the Brownsville Commissioners and Cameron County Commissioners.

ECOLOGY AND WILDLIFE

2.1.1 Location: The location description is mischaracterized. The majority of adjacent surrounding land is part of the Lower Rio Grande National Wildlife Refuge, and also fails to mention the proximity of the South Bay Ecological Preserve, and near the lower Laguna Madre. The omission of protected lands surrounding the Boca Chica Launch Site undermines the recognized importance and presence of the ecology and habitat that are protected. Regulatory decisions regarding SpaceX's proposals must bear in mind and account for these protected lands surrounding SpaceX's Boca Chica Launch Site. Figure 2-2 further mischaracterizes the location. The image predates much of SpaceX's development. Current and closer aerial imagery should be used to reflect the current state of habitat and development. Considerable habitat damage has occurred since the current image was taken, most of which has been in the period between the previous EIS and the multiple addendums and Written Re-Evaluations were implemented.

Section 2.1.1 inadequately describes features of the ecosystems as it states the location is characterized as having “salt flats” and low dunes. Salt flats are dried up desert lake beds. There are no salt flats at this location and the dunes are relatively high, as some can block the view of the LLCC. Tidal flats are rich in marine vegetation and support a wide range of life and are considered critical habitat. To correct these misconceptions of the local ecosystems, an EIS should be done.

The EPA has designated aquatic habitats at the site as Aquatic Resources of National Importance, which brings with it special procedural requirements for Clean Water Act, Section 404 permit review. This would seem to suggest that the impacts of the proposed actions may be significant as well, suggesting in turn that the FAA should prepare an EIS.

On page 99 of the PEA it is stated that, *“The Proposed Action would adversely affect approximately 11 acres of piping plover critical habitat in the floodplain....Unit TX-1 is 7,217 acres, and the total designated piping plover critical habitat in all of Texas is 71,053 acres. Thus the amount affected by the Proposed Action (11 acres) would make up a small percentage of all available piping plover critical habitat. Accordingly these impacts are not considered significant as the habitat loss represents only a small percentage of similar habitat located within the floodplain.”* This is a narrow view of the impacts on floodplains as it does not take into account the compounding of the problems for migratory and nesting birds created by the disturbances from light and noise from the whole of operations at SpaceX. The piping plover is listed as a threatened species and their habitat is also classified as critical. Both circumstances consequently mean that any impact to the piping plover, or their habitat, is significant. Impacts to the piping plover and their habitat must be avoided.

PEA Section 3.9.3.1 and 3.9.3.2 Surface Water and Ground Water: The construction will cause *“increased turbidity in surface waters that may smother fish eggs, aquatic insects, and oxygen producing plants, increase water temperatures, and reduce oxygen levels. Use of construction equipment could result in release of contaminants (e.g., leaks, drips, and spills of petro-chemicals) that could reach nearby waterways and adversely affect water quality. SpaceX would implement its Spill Prevention, Control, and Countermeasures (SPCC) Plan”*. The SPCC should be included in its entirety in an EIS. Any permit requirements applicable should also be summarized and included. Additionally, the frequency of water sampling by TCEQ Texas Surface Water Quality should be defined.

In section 3.14.4.2 Natural Resources, it is stated that “SpaceX uses groundwater for various operations and for personnel use at the facilities. Potable water would either be delivered by truck or pumped from an existing on-site well at the VLA. SpaceX would install water distribution lines to distribute the potable water from the water tower to the facilities to provide potable water to the area. The existing well at the VLA would draw water from the Gulf Coast Aquifer (the Chicot Aquifer).” The Chicot Aquifer in the Houston area has been pumped intensively which has resulted in “significant water-level declines” (<https://setgcd.org/maps/>). The south end of these aquifers are already briney, mostly due to oil and gas development. At what increased rate will land subsidence occur with the increased pumping? Where is the equation that has been calculated for that proportional rate? In the original 2014 EIS, personnel levels were expected to be a single shift of 30 full-time employees working 8:00 to 5:00 except for during launch operations when there would be more. It was stated that between 2016 and 2025 the number would be 130-250. The plan for potable water to “be delivered by truck to a holding tank at the VLA or pumped from a well on the property” and the plan for a “septic system (that would consist of a mobile above ground processing unit and holding tank” needs reevaluation for the greatly increased, multiple-shift work force. Only with an EIS, can the impact of water resource use, including Brownsville’s municipal sources, by SpaceX operations be adequately analyzed.

Disturbance of the Rio Grande Alluvium. Alluvial soils are important as they remove sediments and nutrients flowing in the adjacent water. They can also remove other contaminants from rivers and improve water quality for downstream communities. SpaceX says this won’t be affected by pile driving, however, the PEA insufficiently analyzes this issue.

The disturbance to wildlife is downplayed in the discussion of “noise-induced startle response” (PEA pp.113-114). While it is acknowledged that, “A startle response from nesting birds can result in broken eggs or cause immature young that are not flight-capable to flee the nest. Repeated nest failures could eventually trigger desertion of a nesting area.” The issue is not resolved since, “There are no mitigation measures currently available to reduce the chances of noise-induced startle responses but monitoring of select species could determine if noise was responsible for reduced reproductive success.” It then speculates that “Noise from the Proposed Action would not be expected to cause a significant impact because the noise events are infrequent and short-term and would not result in impacts at the population level.” The words *infrequent* and *short term* downplay the effects, especially when other negative effects of increased lighting and road traffic are added to the day-to-day conditions.

In the Starship Noise Assessment for Operations at the Boca Chica Launch Facility found in Appendix B of the Draft PEA it states, *“As mentioned, DNL is necessary for policy. The next two metrics (L_{Amax} and SEL) are A-weighted and provide a measure of the impact of individual events. Loud individual events can pose a hearing damage hazard to people and can also cause adverse reactions by animals. Adverse animal reactions can include flight, nest abandonment, and interference with reproductive activities. The last two metrics, OASPL or L_{max} (the maximum overall sound pressure level), for individual events; and spectra, may be needed to assess potential damage to structures and adverse reaction of species whose hearing response is different from that of humans. Reported levels are A-weighted unless otherwise noted.”* (p. 3 *Starship Noise Assessment for Operations at the Boca Chica Launch Facility*; 8/18/2021) What is not even addressed is the effect of the shock wave that will occur from the launch of the Starship. Since the integrated Starship/Super Heavy will be twice the power of the Saturn V, that would make the “noise” at launch 230 decibels. At 190 decibels a shock wave occurs. This is not noise. Sound of this magnitude will deafen anything living in the area, and for animals, deafening is fatal. An EIS is needed to assess the adverse reaction of all species.

In the PEA Appendix E Section 4(f), p. 5-6, the FAA states that it is seeking input regarding the effect of road closures and other access restrictions and noise levels on the NWR. Unless an EIS is completed, how will this NWR assessment be implemented?

Section 2.1.3.7: SpaceX has not coordinated closely with USFWS and TPWD for debris removal to ensure minimal damage to the tidal flats. Previous debris removal of failed Starship landings has resulted in damage to refuge areas, particularly in tidal flats. This has demonstrated either a lack of an anomaly response plan, or a failure in implementation. In coordination with applicable agencies and organizations, an anomaly response plan that includes restoration strategies for damaged areas should be completed and included in an EIS. An EA without this plan fails to identify avoidance, minimization, and mitigation of impacts to the ecology and wildlife of the surrounding NWRs, violating NEPA.

Section 3.10.3.2 references the Marine Habitats and Wildlife impact assessment. This only addresses activities related to downrange recovery or landing of rockets in the Gulf of Mexico. The Essential Fish Habitat Assessment completely ignores the adjacent South Bay, which

provides EFH for a wide range of commercially/recreationally important fish and shellfish. It is also considered to be a nursery area for Atlantic bottlenose dolphins.

Section 3.10.4.1: An EIS is needed for SpaceX proposals particularly regarding impacts to wildlife from construction expansion of the VLA and construction of launch related infrastructure such as the power plant, LNG plant, and desalination plant and impacts on wildlife. The claim that SpaceX construction would be short term is not accurate as evidenced from non-stop construction operations since initial ground breaking at the Boca Chica site. Currently, it has been reported that increased traffic (e.g. SpaceX employees, workers contracted with SpaceX, visitors, etc.) and traffic exceeding the speed limit has led to an increase of wildlife mortality on State Hwy 4. An EIS is needed to account for all construction and operations, including a timeline of SpaceX proposals. Cooperating agencies should identify avoidance and mitigation strategies, as well as implement a plan for enforcement. To the north and south of State Hwy 4 is the Lower Rio Grande National Wildlife Refuge that provides habitat for federally Threatened or Endangered species. Without specifics of design plans and construction timelines, SpaceX's claim that construction impacts on habitats and wildlife are anticipated to be less than significant and that construction under the proposed action have a similar negligible impact is not substantiated.

In reference to contracting a qualified biologist for pre/during/post construction monitoring (Section 3.10.5), SpaceX does not identify who or what entity would be contracted. The Lower Rio Grande Valley Sierra Club recommends USFWS and TPWD be consulted and be responsible for selecting the qualified biologist (Coastal Bend Bays and Estuaries has been used in the past). Furthermore, the monitoring, documentation, and data particularly during bird migration season, needs to be openly shared with USFWS, TPWD, and openly published and accessible to the public.

3.12.4: Environmental Consequences: The determination that the *“Proposed Action is not expected to result in significant land use impacts because the Proposed Action is consistent with existing uses of land, would not change land use, and would occur according to existing plans and procedures”* is not substantiated due to inadequate and missing information about proposed infrastructure and operations. An EIS is needed to determine compatibility of land use and environmental consequences. For instance, the gas treatment and liquefaction (LNG) infrastructure and operations are not fully detailed. Potential land use conflicts arise with the source of gas and delivery of gas to the power plant and LNG facility which would likely require

a pipeline to go through either the Lower Rio Grande Valley National Wildlife Refuge, Boca Chica State Park, or Laguna Atascosa National Wildlife Refuge.

Section 3.9.4.3 p. 95: The determination that “*the Proposed Action includes all practicable measures to minimize harm to wetlands that may result from construction*” is erroneous and not substantiated. As stated in the PEA, “*Construction activities could also affect adjacent wetlands through ground disturbance activities and use of construction equipment*” is a recognition that all practicable measures to minimize impacts have not been taken. In fact, it is admitted to in the PEA that the USACE has not yet completed its evaluation of SpaceX’s proposed impacts and wetland mitigation pursuant to CWA section 404(b)(1) Guidelines (40 CFR 230) and section 404q.

PEA Section 3.10.4.1. Terrestrial Habitats and Wildlife. It is stated that the 2014 EIS speed reduction measures will be implemented to mitigate construction vehicle strikes and fatalities with wildlife. Unfortunately, the situation has gotten worse as vehicular traffic has increased. Roadkill events need to be quantified based on what has occurred so far with the current amount of vehicular construction traffic.

ALTERNATIVES

The PEA should examine more alternatives, rather than just the “all or nothing” alternatives. One of the other alternatives that should be included in an EIS is moving the *testing of Super Heavy* to a designated large rocket testing site, such as Provo, Utah or Stennis AFB in Mississippi. The latter is where the Saturn V rocket was tested, and where the Space Launch Systems (SLS) rocket is currently being tested. Another alternative should include test launching Super Heavy offshore or from Cape Canaveral. Noted is a reference in Appendix A, page 3, indicating that NASA has already completed an environmental assessment for launching the Starship Super/Heavy at KSC “NASA.2019. Environmental Assessment for the SpaceX Starship and Super Heavy Launch Vehicle at Kennedy Space Center (KSC).⁴ Alternatives considered are only those pertaining to launches/landings. Alternatives to minimize impacts of other operations have not been considered. SpaceX’s proposed operations include elements that are identified as necessary for their launch operations (identified in Table 2-1 p. 9) including, but not limited to, the power plant, and gas treatment and liquefaction. Alternatives to avoid, minimize and mitigate impacts from such elements of SpaceX operations have not been

⁴ https://netspublic.grc.nasa.gov/main/20190919_Final_EA_SpaceX_Starship.pdf p256

considered. These elements to operations need more analysis to determine impacts and alternatives, particularly the source and delivery of natural gas for the power plant and natural gas treatment and liquefaction but also for other elements such as the desalination plant.

Other elemental alternatives not considered to reduce impact is off site parking lots and use of shuttle busses, carpools or vanpools. These alternatives would mitigate impacts to runoff, aquatic habitats, ongoing issues with traffic, violation of speed limits, and wildlife mortality on State Hwy 4. The proposed parking lot could potentially impact 14 acres of seagrasses that lie within 1 km to the north. Parking lot construction could result in increased sediment loading to Boca Chica Bay, potentially resulting in increased light attenuation on the seagrass beds. Seagrasses are highly sensitive to reductions in light availability. Dunton et al (2003) recommended no dredging within 1 km of seagrass beds in Laguna Madre.

LAWS AND REGULATIONS

- Table 2-1 lists elements of the proposed action. SpaceX has already been constructing some of the infrastructure prior to approval of this PEA. As one example, SpaceX has been violating this by continuing to build infrastructure including a 450 foot integration tower. NEPA is very clear that project construction cannot begin (“irretrievable and irreversible commitment of resources”) until the environmental review is done. SpaceX must be held accountable for any and all NEPA violations for unapproved/permitless construction.
- SpaceX must be prohibited from operating in the Boca Chica / refuge area. 40 CFR1501.3 requires a full Environmental Impact Statement (EIS) because SpaceX’s activities violate strictly enforced federal law, the Refuge Improvement Act, which mandates that no use of the refuge is allowed if it is incompatible with purposes of refuge, which is conservation of lands for the benefit of wildlife. SpaceX’s activities are incompatible with the Refuge and must be disallowed altogether. Additionally, the Department of Transportation Act requires the consideration of natural resources during project development. 23 U.S.C. § 138 Federal regulations state that a constructive use of property protected by Section 4(f) occurs when a project does not incorporate land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under

Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished. 23 C.F.R. § 774.15 identifies potential causes of constructive use include shifts in user population because of direct use of bordering properties, and/or non-physical intrusions such as noise, air pollution, or other effects that would substantially impair the resource's use." Constructive use is occurring around the SpaceX site with regards to accessibility to Boca Chica Beach, South Bay Coastal Preserve, Lower Rio Grande NWR, and Palmito Ranch Battle Field, and declining nesting of certain bird species in NWR areas near SpaceX as documented by the Coastal Bend Bays and Estuary Program. Section 4 (f) requires all possible planning to minimize harm resulting from the use; this has not been practiced, documented, or evidenced on the behalf of SpaceX or in the PEA. Furthermore, an accurate determination of impact is not achievable due to lacking information on elements of SpaceX's operations, and has thus failed to avoid, minimize, and mitigate impacts. A true and accurate finding of effects of SpaceX's proposals under Section 4(f) and Section 106 is not possible. In all of the foregoing, FAA is overstepping its statutory authority in making a compatibility determination. That is a call that only USFWS can make, not the FAA.

- The Endangered Species Act: the scope of activities vastly exceeds that to which the original biological opinion responds, since that opinion was issued for regular launches of a smaller, proven rocket only, not one in its testing and development phases, when explosions and failures are expected.
- Texas Open Beaches Laws are being violated. *Texas Constitution. Art. 1 sec. 33; 61 Tex. Nat. Res. Code Sec. 61.011: The public has an unrestricted right to use and a right of ingress to and egress from a public beach.* Closure of Boca Chica beach and State Highway 4 for SpaceX activities, deprives the public of the use of the beach, and therefore is in violation of the constitutional rights of the people of the State of Texas. Closures are also violations of Section 4(f) of Department of Transportation Act of 1966. Letters to the FAA from the Department of the Interior, dated January 10, 2014 and October 7, 2020 identifies the ongoing issues and lack of avoidance with regards to constructive use relating to closures.

- Part of the existing facility lies within Coastal Barrier Resources System Unit T12. Therefore, if this existing project includes any Federal funding, it would violate the Coastal Barrier Resources Act (CBRA). Similarly, if any Federal funding is involved in the current proposed expansion, it too would violate the Coastal Barrier Resources Act. Finally, FAA's statement that SpaceX intends to use the site to meet what it claims are official US space program goals, suggests that SpaceX intends to use the site to accomplish US government funded missions, which would appear to violate the CBRA. Violations may include federal funding of \$14.4 million.⁵
- Even more egregious, the PEA explicitly states that it is SpaceX's intent to participate in FEMA's National Flood Insurance Program (NFIP) (3.9.4.4 Floodplains; p. 98; 1st complete paragraph; 2nd sentence). Note that, *in particular*, the CBRS is intended to restrict the ability to obtain National Flood Insurance in CBRS units. The PEA must be revised to reflect this, and FAA must acknowledge that it is unacceptable for SpaceX to pursue Federal flood insurance for portions of the project that are on, or would be on, CBRS units. Regarding the following assertions, as stated in 3.9.4.4 p98: *"The design engineer will certify that the design elevation will withstand the depth and velocity of 100-year flood events (hydrostatic and hydrodynamic loads), any potential increase in wind load, or any other relevant load factors. Compliance with the NFIP as well as county regulations would ensure that the construction will have no significant impacts on floodplain storage and base flood elevations"*. This is not possible. The close proximity to the Gulf of Mexico shoreline and the extremely low topography surrounding the site, virtually guarantee significant damage to the existing and proposed facilities during future tropical storms, due to storm surge and overwash.
- 2.1.3.4 (p. 17): States SpaceX *"would develop appropriate sampling protocols and water quality criteria in coordination with the Texas Commission on Environmental Quality (TCEQ)." This is not the legal process as outlined in Texas Administrative Code Chapter 307. It is TCEQ, not SpaceX, that is responsible for sampling and water quality criteria. However, SpaceX would be required to monitor discharge in accordance to permit conditions as mandated by TCEQ. SpaceX determining their own protocols regarding sampling and water quality criteria is not in accordance with Texas Administrative Code.*

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<https://spacenews.com/blue-origin-rocket-lab-spacex-ula-win-space-force-contracts-for-rocket-technology-projects/>

In the absence of design plans of elements of their proposals, a full accounting and disclosure of what the stormwater pollutant load might be is lacking. An EIS is needed to account for all elements which include various types of industrial activities.

- The USACE public notice for SpaceX's current application for a Clean Water Act Section 404 permit suggests that SpaceX's application may not be compliant with CWA Section 404(b)(1) Guidelines. SpaceX has not demonstrated required avoidance and minimization of impacts to aquatic habitats. They have not demonstrated required consideration of alternatives. They have not demonstrated that their proposal is the Least Environmentally Damaging Practicable Alternative (LEDPA), as required by the Guidelines. Nor have they provided the public with any information regarding proposed mitigation for unavoidable impacts to aquatic habitats.
- Considerations regarding alternatives are inadequate and have not been analyzed to the fullest extent as required by 2 U.S.C. 4332(E), 40 C.F.R. 1501.5(2), 40 C.F.R. 1501.5(4), Section 102(2)(E) of NEPA.

OMISSIONS

The following documents were referenced, but not provided in the PEA. Without access to these documents, the public can only speculate as to their existence and efficacy, and therefore makes them unenforceable.

1. Anomaly Response Plan
2. Security Plan
3. Fire Mitigation and Response Plan
4. Applicable Site Plans
5. Facility Design and Lighting Plan
6. SpaceX Roadway Closure and Traffic Control Plan
7. Flight Package Safety Data
8. Closure Notification Plan
9. Speed Monitoring Plan (at construction and operations site)
10. The Communication Process, or Plan, with the GLO, TPWD, and USFW for Debris Removal
11. Spill Prevention, Control, and Countermeasures (SPCC) Plan

12. Mitigation Plans for identified filling or destruction of wetlands
13. Stormwater Pollution Prevention Plan (SWPPP)
14. Safety Risk Analysis (missing from Draft EA)
15. Hazard Risk Analysis (missing from Draft EA)
16. Identification of the emergency response team. (Are public resources used? if so, what is the cost to Cameron County?)
17. The Letter of Agreement which outlines procedures and responsibilities applicable to operations including notification of launch activity; communication procedures prior to, during, and after a launch; planning for contingencies/emergencies; NOAA issuance; and any other measures necessary to protect public health and safety.

Lacking the proof of existence, creation, or updates to the aforementioned plans, the prevention, response, avoidance, minimization, or mitigation to impacts cannot adequately be determined. Additionally, phrases used such as “to the extent practicable” makes plans and operations unenforceable, such as found in the PEA’s light plan. These phrases are vague, lack detail, and are open to interpretation. Due to the lack of the inclusion of the aforementioned plans and language in reference to the plans, an EIS is needed.

Thank you for holding this important Public Hearing and giving the public an opportunity to comment on the Draft PEA.

Respectfully,

Patrick Anderson, Chair
Lower Rio Grande Valley Sierra Club