

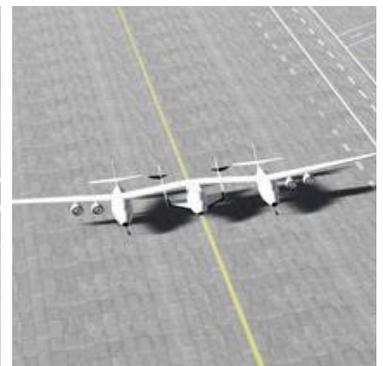


Federal Aviation
Administration

Final Environmental Assessment, Finding of No Significant Impact, and Record of Decision for the Houston Spaceport, City of Houston, Harris County, Texas

APPENDICES A - G

June 2015



This Page Intentionally Left Blank

APPENDIX A

EARLY NOTIFICATION LETTER

This Page Intentionally Left Blank

APPENDIX A-1

EARLY NOTIFICATION LETTER

This Page Intentionally Left Blank



10748 Deerwood Park Blvd South
 Jacksonville, Florida 32256
 Voice 904 256 2500
 Fax 904 256 2502

10/11/13

CONTACT NAME
 AGENCY
 ADDRESS
 CITY, STATE, ZIP

RE: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. or Ms.:

The purpose of this letter is to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport (see **Attachment 1**).

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged RLVs at Ellington Airport. The Federal Aviation Administration, Office of Commercial Space Transportation (FAA/AST) will review the license application based on several factors, including the completion of an Environmental Assessment (EA). HAS selected RS&H to conduct the technical and analytical studies required for a launch site operator's license application, including the EA.

The Proposed Action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment, and other initial infrastructure (i.e., an oxidizer loading area) necessary to accommodate either a Concept X or Z vehicle and support equipment. The initial infrastructure would be sized to house either RLV and would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities. Should Ellington Airport need additional spaceport facilities beyond the Proposed Action, environmental approvals will be completed accordingly.

Attachment 2 shows examples and descriptions of the RLV concept vehicles. The winged RLVs would operate similarly to today's aircraft and use common fuels for propulsion, such as Jet A. The rockets used by the RLVs use refined kerosene similar to Jet A (RP-1) or solid hybrid fuels chemically similar to rubber or paraffin, and oxidizers such as liquid oxygen, nitrous oxide or hydrogen peroxide. No hypergols or other hazardous materials are used in these vehicles. At this time, it is anticipated that the RLVs would follow a southerly flight path toward the Gulf of Mexico to conduct its operation to suborbital altitudes (see **Attachment 3**).

Proposed are approximately up to 50 total commercial RLV operations per year; significantly lower than the current number of aircraft operations at Ellington Airport (FAA Terminal Area Forecast - 2012 – approximately 145,000 total operations). The development of vehicle operating/safety areas and established operating procedures associated with the launch site operator's license application (14 CFR Part 420) will help to ensure the safety of the RLV and the uninvolved public.

10/11/13
Page 2 of 5

In preparing the EA, RS&H will meet the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA); FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The EA will evaluate the potential direct, indirect, and cumulative environmental effects associated with the Proposed Action and analyze reasonable alternatives to the Proposed Action; including a No-Action Alternative.

On behalf of HAS, RS&H is sending this early notification letter to:

1. Advise you of the preparation of the EA;
2. Seek any relevant information you may have regarding the environment (e.g., human, natural, or physical) within the vicinity of Ellington Airport; and
3. Solicit early environmental comments and concerns regarding potential environmental, social, and economic issues for consideration during preparation of the EA.

We would appreciate any information and/or comments you would like to contribute. Your input will be useful to HAS, RS&H, and the FAA/AST for making the most informed decisions throughout the EA process. You may send (via post or email) information and/or comments by **November 11, 2013** to:

Reynolds, Smith and Hills, Inc.
Attn. David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597
David.Alberts@rsandh.com

Thank you for your interest in this project and we look forward to working with you as we prepare this EA. If you have any questions, or would like additional information regarding the Proposed Action, please do not hesitate to contact me.

Sincerely,



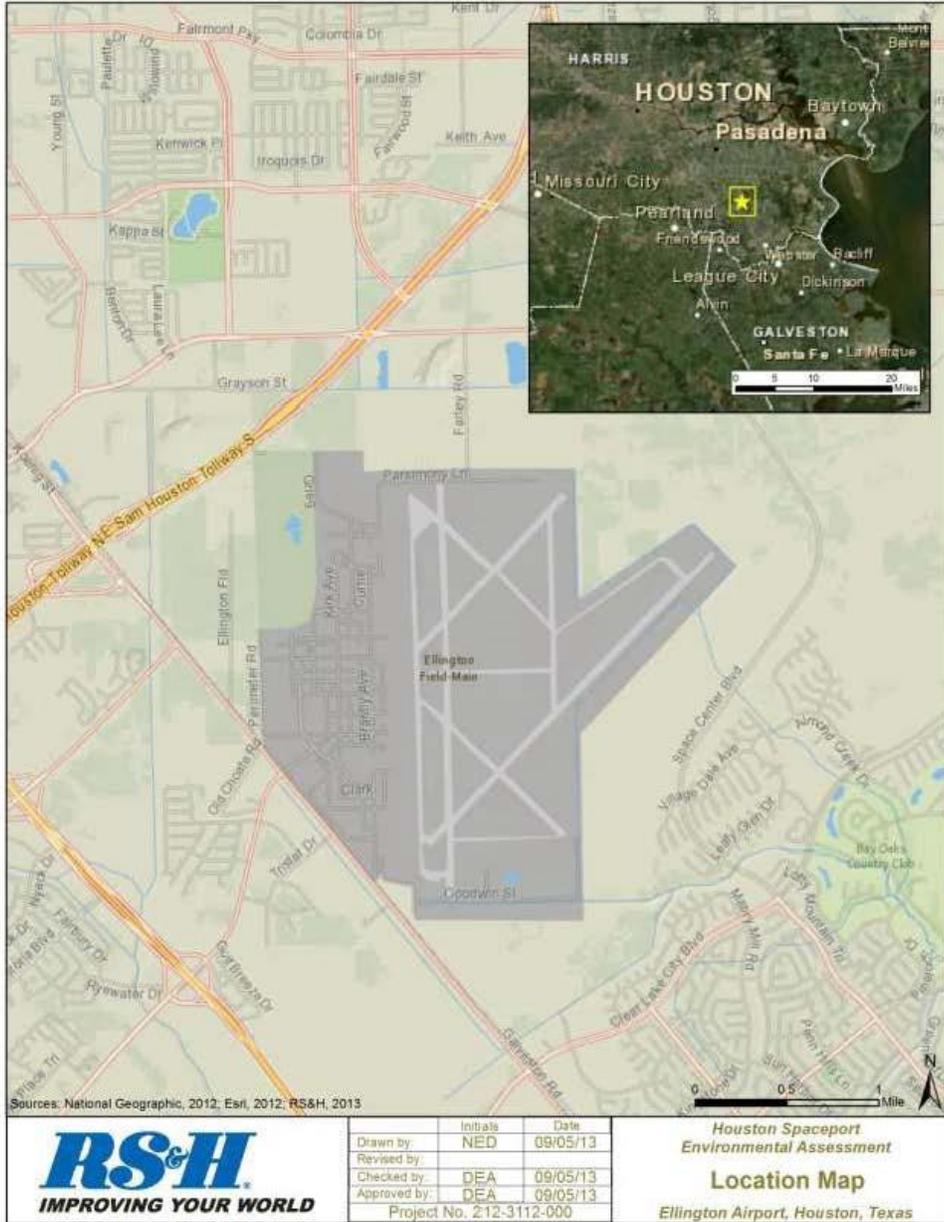
David E. Alberts
Southeast Region Environmental Service Group Leader

Attachments: Attachment 1 – Location Map
Attachment 2 – Example of Concept X and Z Vehicles
Attachment 3 – Sample Flight Path

Cc: Arturo Machuca, Houston Airport System
Carlos Ortiz, Houston Airport System
Dan Czelusniak, FAA/AST
File

10/11/13
Page 3 of 5

Attachment 1
Location Map



Attachment 2
Concept X and Z Vehicle Examples

Concept X Vehicle Examples



Concept Z Vehicle Examples



Reusable Launch Vehicle	Takeoff Power Source	Power Source to Reach Sub-orbital Altitude ¹	Power Source to Land at Spaceport
Concept X	Aircraft engine	Rocket engine	Aircraft engine/glide
Concept Z	Aircraft engine ²	Rocket engine	Glide, no power ³

Notes:
 1 - Occurring at approximately > 40,000 feet mean sea level
 2 - Launch vehicle carried via larger aircraft to designated launch area
 3 - Carrier vehicle would land under conventional jet aircraft engine power.

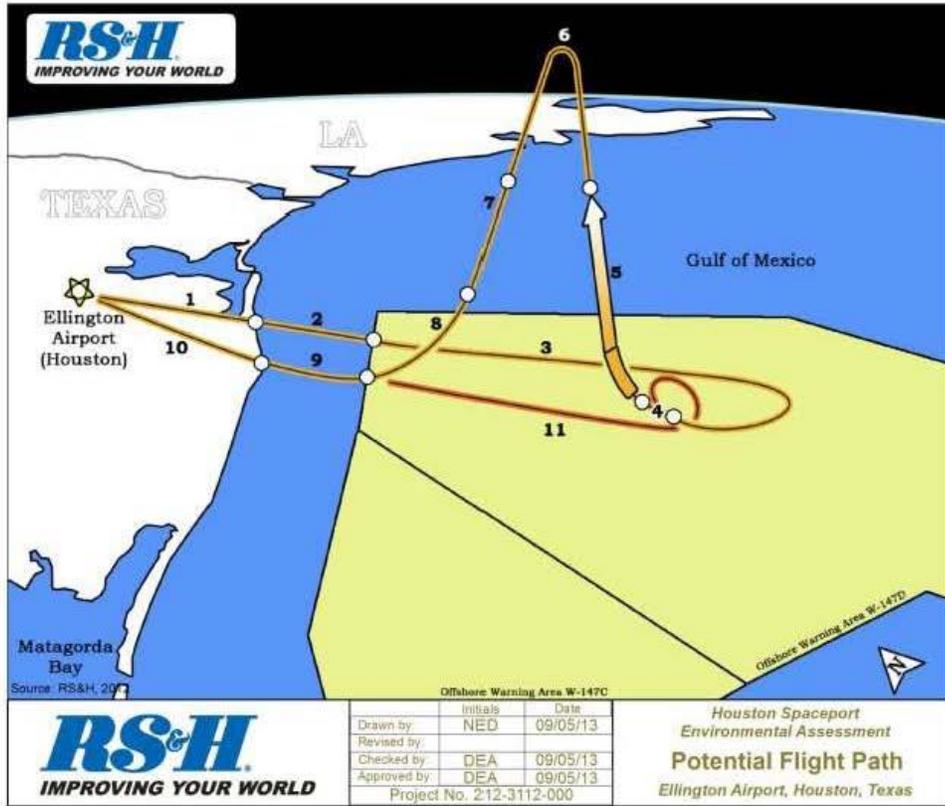


	Initials	Date
Drawn by:	NED	09/05/13
Revised by:		
Checked by:	DEA	09/05/13
Approved by:	DEA	09/05/13
Project No. 2-12-3112-000		

Houston Spaceport
 Environmental Assessment
**Examples of
 Concept X and Z Vehicles**
 Ellington Airport, Houston, Texas

10/11/13
Page 5 of 5

Attachment 3
Sample Flight Path



Houston Spaceport Environmental Assessment Early Coordination Mailing List

Federal

Mr. Daniel Czelusniak
Federal Aviation Administration
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Ms. Stacey Zee
Federal Aviation Administration
801 Independence Avenue, SW, Suite 325
Washington, DC 20592

Mr. Cameron Bryan
Federal Aviation Administration
2602 Meacham Boulevard, Room 610
Fort Worth, TX 73138

Ms. Teresa Bruner
Federal Aviation Administration
2601 Meacham Boulevard
Fort Worth, TX 76137

Mr. Dean McMath
Federal Aviation Administration
2601 Meacham Boulevard, Room 697
Fort Worth, TX 73137

Mr. Tony Robinson
Federal Emergency Management Agency
FRC 800 North Loop 288
Denton, TX 76209

Mr. Robert Tally
Federal Highway Administration
300 E. 8th Street, Room 826
Austin, TX 78701

Dr. Ellen Ochoa
NASA
2101 NASA Parkway
Houston, TX 77058

Ms. Tina Norwood
National Aeronautics and Space
Administration
300 E Street SW, Suite 5B11
Washington, DC 20546

Dr. Roger Zimmerman
National Oceanic and Atmospheric
Administration
4700 Avenue U
Galveston, TX 77551

Mr. Salvador Salinas
Natural Resources Conservation Services
101 South Main Street
Temple, TX 76501

Col. Richard P. Pannell
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553

Mr. Dan Deerinwater
U.S. Bureau of Indian Affairs
P.O. Box 368
Anadarko, OK 73005

Ms. Jennifer Montoya
U.S. Bureau of Land Management
1800 Marquess Street
Las Cruces, NM 88005

EARLY NOTIFICATION LETTER

Mr. Mark Trevino
U.S. Bureau of Reclamation
5316 Highway 290 West, Suite 110
Austin, TX 78735

Capt. Brian Penoyer
U.S. Coast Guard
9640 Clinton Drive
Houston, TX 77029

CDR Scott E. Langum
U.S. Coast Guard Air Station Houston
1178 Ellington Field, Sneider
Houston, TX 77034

Ms. Barbara R. Britton
U.S. Department of Housing and Urban
Development
801 Cherry Street, Room 2862
Fort Worth, TX 76102

Mr. Stephen Spencer
U.S. Department of Interior
1001 Indian School Road, NW, Suite 348
Albuquerque, NM 87104

Mr. Mark Briggs
U.S. Department of Labor
17625 El Camino Real, Suite 400
Houston, TX 77058

Ms. Rhonda Smith
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202

Mr. Ron Curry
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, TX 75202

Mr. Edith Erling
U.S. Fish and Wildlife Service
17629 El Camino Real, #211
Houston, TX 77058

Mr. Denise Baker
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, NM 87103

Ms. Liz Agpaoa
U.S. Forest Service
1720 Peachtree Road NW
Atlanta, GA 30309

Ms. Marjorie McColl Petty
U.S. Health and Human Services
1301 Young Street, Suite 1124
Dallas, TX 75202

Mr. John Wessels
U.S. National Park Service
12795 Alameda Parkway
Denver, CO 80225

The Hon. Randy Weber
U.S. House of Representatives
174 Calder Road
League City, TX 77573

The Hon. Pete Olson
U.S. House of Representatives
6302 W. Broadway Street, Suite 220
Pearland, TX 77581

The Hon. Gene Green
U.S. House of Representatives
11811 I-10 East, Suite 430
Houston, TX 77029

The Hon. Steve Stockman
U.S. House of Representatives
8060 Spencer Highway, San Jacinto
College, Building 1, Room 108
Pasadena, TX 77505

Ms. Kellye Rila
Texas Commission on Environmental
Quality
P.O. Box 13087, MC 160
Austin, TX 78711

The Hon. John Cornyn
U.S. Senate
5300 Memorial Drive, Suite 980
Houston, TX 77007

Ms. Jennifer Bailey
Texas Department of Agriculture
5425 Polk Street, Suite G-20
Houston, TX 77023

The Hon. Ted Cruz
U.S. Senate
1919 Smith Street, Suite 800
Houston, TX 77002

Dr. Brian Smith
Texas Department of State Health Services
5425 Polk, Suite J, MC 1906
Houston, TX 77023

State

Mr. Milton Rister
Railroad Commission of Texas
P.O. Box 12967
Austin, TX 78711

Mr. David Fulton
Texas Department of Transportation
125 E. 11th St.
Austin, TX 78701

Col. Terence Winkler
Texas Air National Guard
14657 Sneider
Houston, TX 77034

Mr. Michael W. Alford
Texas Department of Transportation
P.O. Box 1386
Houston, TX 77251

Ms. Ashley K. Wadick
Texas Commission on Environmental
Quality
5425 Polk Street, Suite H
Houston, TX 77023

Mr. Michael L. Williams
Texas Education Agency
1701 N. Congress Avenue
Austin, TX 78701

Mr. David Brymer
Texas Commission on Environmental
Quality
P.O. Box 13087, MC 206
Austin, TX 78711

Ms. Helen Young
Texas General Land Office
P.O. Box 12873
Austin, TX 78711

Mr. Jeffrey Davis
Texas General Land Office
P.O. Box 1675
Galveston, TX 77553

EARLY NOTIFICATION LETTER

Ms. Tara Ellis Mealy
Texas General Land Office
P.O. Box 1675
Galveston, TX 77553

Mr. Mark Wolfe
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711
Mr. Carter Smith
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744

Ms. Rebecca Hensley
Texas Parks and Wildlife Department
1502 FM 517 East
Dickinson, TX 77539

The Hon. Rick Perry
State of Texas
P.O. Box 12428
Austin, TX 78711

The Hon. Craig Eiland
Texas House of Representatives
9702 E.F. Lowery Expressway
Texas City, TX 77591
The Hon. Greg Bonnen
Texas House of Representatives
174 Calder Road, Suite 116
League City, TX 77573

The Hon. Dennis Bonnen
Texas House of Representatives
122 E. Myrtle
Angleton, TX 77515

The Hon. Ed Thompson
Texas House of Representatives
P.O. Box 2910
Austin, TX 78768

The Hon. Wayne Smith
Texas House of Representatives
909 Decker Drive, Suite 104
Baytown, TX 77520

The Hon. John E. Davis
Texas House of Representatives
1350 NASA Parkway, #212
Houston, TX 77058

The Hon. Alma A. Allen
Texas House of Representatives
10101 Fondren Road, Suite 500
Houston, TX 77096

The Hon. Carol Alvarado
Texas House of Representatives
2900 Woodridge Drive, Suite 305
Houston, TX 77087

The Hon. Garnet F. Coleman
Texas House of Representatives
5445 Almeda, Suite 501
Houston, TX 77004

The Hon. Sylvia R. Garcia
Texas State Senate
5425 Polk Street, Suite 125
Houston, TX 77023

The Hon. Larry Taylor
Texas State Senate
174 Calder Road, Suite 151
League City, TX 77573

Mr. Denise S. Francis
Governor's Office of Budget and Planning
P.O. Box 12428
Austin, TX 78711

Mr. Ray Newby
Texas General Land Office
1700 N. Congress
Austin, TX 78701

Regional

Mr. Jack Steele
Houston-Galveston Area Council
P.O. Box 22777
Houston, TX 77227

Counties

The Hon. Donald "Dude" Payne
Brazoria County
P.O. Box 998
Clute, TX 77531

The Hon. Matt Sebesta
Brazoria County
21017 CR 171
Angleton, TX 77515

The Hon. Stacy L. Adams
Brazoria County
P.O. Box 548
Alvin, TX 77512

The Hon. Ryan Dennard
Galveston County
722 Moody, 1st Floor
Galveston, TX 77550

The Hon. Kevin O'Brien
Galveston County
111730 Highway 6
Sante Fe, TX 77510

The Hon. Stephen D. Holmes
Galveston County
9850-A Emmett F. Lowry Expressway, Suite
A100
Texas City, TX 77591

The Hon. Ken Clark
Galveston County
174 Calder Road
League City, TX 77573

The Hon. El Franco Lee
Harris County
1001 Preston Avenue, Suite 950
Houston, TX 77002

The Hon. Jack Morman
Harris County
16603 Buccaneer
Houston, TX 77062

Mr. Mike Talbott
Harris County Flood Control District
9900 Northwest Freeway
Houston, TX 77092

Dr. Umair A. Shah
Harris County Public Health and
Environmental Services
2223 West Loop South
Houston, TX 77027

Mr. John R. Blount
Harris County Public Infrastructure
Development
1001 Preston, 7th Floor
Houston, TX 77002

The Hon. Joe King
Brazoria County
111 E. Locust Street, Suite 102
Angleton, TX 77515

The Hon. Ed Emmett
Harris County
1001 Preston, Suite 911
Houston, TX 77002

The Hon. Steve Spicer
City of Jamaica Beach
5264 Jamaica Beach
Jamaica Beach, TX 77554

The Hon. Mark Henry
Galveston County
722 Moody, Suite 200
Galveston, TX 77550

The Hon. Bobby Hocking
City of La Marque
1111 Bayou Road
La Marque, TX 77568

Cities

The Hon. Gary Appelt
City of Alvin
216 West Sealy
Alvin, TX 77511

The Hon. Tim Paulissen
City of League City
300 W. Walker
League City, TX 77573

The Hon. Julie Masters
City of Dickinson
4403 Highway 3
Dickinson, TX 77539

The Hon. Bill Strickland
City of Liverpool
P.O. Box 68
Liverpool, TX 77577

The Hon. Kevin M. Holland
City of Friendswood
910 South Friendswood Drive
Friendswood, TX 77546

The Hon. Mark Denman
City of Nassau Bay
P.O. Box 58448
Nassau Bay, TX 77258

The Hon. Lewis Rosen
City of Galveston
P.O. Box 779
Galveston, TX 77553

The Hon. Johnny Isbell
City of Pasadena
1211 Southmore
Pasadena, TX 77502

The Hon. Tom Wilson
City of Hillcrest Village
P.O. Box 1172
Alvin, TX 77512

The Hon. Tom Reid
City of Pearland
3519 Liberty Drive
Pearland, TX 77581

The Hon. Anthony Matranga
City of Hitchcock
7423 Highway 6
Hitchcock, TX 77563

The Hon. Ralph Stenzel
City of Santa Fe
P.O. Box 950
Santa Fe, TX 77510

The Hon. Matthew T. Doyle
City of Texas City
P.O. Box 2608
Texas City, TX 77592

The Hon. Floyd H. Myers
City of Webster
101 Pennsylvania
Webster, TX 77598

EFD Tenants

Mr. Robert Amey
Aerosim Flight Academy
12711 Blume Avenue, Ellington Field
Houston, TX 77034

Ms. Helene McCorvey
Flying Tigers
12711 Blume Avenue
Houston, TX 77034

Mr. William E. King
Southwest Airport Services
Ellington Field Building 500, 11811 N.
Brantly Road
Houston, TX 77034

Mr. Randall L. Reed
Starbase Jet Charter
11210 Blume Avenue
Houston, TX 77034

Ms. Laura Hays
TrustComm
11140 Aerospace Avenue
Houston, TX 7703

APPENDIX A-2

AGENCY RESPONSE LETTERS

This Page Intentionally Left Blank

Response Letters Received

Texas Parks and Wildlife.....	A-21
NASA.....	A-23
FEMA.....	A-24
Texas Commission on Environmental Quality.....	A-27
USFWS (two letters received).....	A-29
Flying Tigers.....	A-51
National Park Service.....	A-52
USCG.....	A-53
Harris County Public Health and Environmental Services.....	A-54
Texas Historical Commission.....	A-55
NASA.....	A-57
Texas General Land Office.....	A-59

This Page Intentionally Left Blank

Texas Parks and Wildlife



Life's better outside.®

Commissioners

T. Dan Friedkin
Chairman
Houston

Ralph H. Duggins
Vice-Chairman
Fort Worth

Antonio Falcon, M.D.
Rio Grande City

Dan Allen Hughes, Jr.
Beeville

Bill Jones
Austin

James H. Lee
Houston

Margaret Martin
Boerne

S. Reed Morlan
Houston

Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

December 3, 2013

David Alberts
Reynolds, Smith and Hills, Inc.
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0957

RE: Proposed Houston Spaceport at Ellington Airport
Harris County, Houston, Texas

Dear Mr Alberts:

Under section 12.0011 of the Texas Parks and Wildlife Code, Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at <http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011>. For tracking purposes, please refer to TPWD project number ERCS-8068 in any return correspondence regarding this project.

Project Description

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged reusable launch vehicles (RLV's) at Ellington Field. The proposed action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, storm water treatment, and other initial infrastructure necessary to accommodate either a Concept X or Z vehicle and support equipment. Based upon our November 2013 telephone conversation, TPWD understands that due to the nature of the proposed aircraft and the flight path, the associated sonic boom will take place at approximately 45,000 feet above ground level allowing noise to travel towards space rather than towards the ground. In addition, the proposed flight path of the vehicles will take place over the Gulf of Mexico.

Recommendation: Because construction activities associated with this project would be located within previously-disturbed portions of the existing airport, adverse impacts to fish and wildlife resources from the footprint of the proposed project are expected to be minimal.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

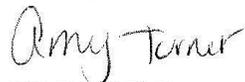
Texas Parks and Wildlife Continued

Mr. Alberts
December 3, 2013
Page 2 of 2

Based upon the limited information provided, TPWD also has minimal concerns regarding the noise impacts upon terrestrial species. However, if the project has the potential to disturb terrestrial wildlife by increased noise levels or by other means, TPWD recommends the applicant resubmit the project for review and include an evaluation of potential impacts to rare resources including the Attwater's Prairie Chicken (*Tympanuchus cupido attwateri*), and Whooping Crane (*Grus americana*). If aquatic species could be impacted as a result of the proposed project, TPWD recommends the applicant coordinated with Winston Denton with our Coastal Program; he can be reached at 281-534-1038.

Please contact TPWD staff, Amy Turner, Ph.D., Wildlife Habitat Assessment Biologist, at (361) 576-0022 if you have any questions or need additional assistance.

Sincerely,



Amy Turner, Ph.D.
Wildlife Habitat Assessment Program
Wildlife Division

AJT:ERCS-8068

NASA

Alberts, David

From: Norwood, Tina (HQ-LD020) <tina.norwood-1@nasa.gov>
Sent: Wednesday, October 23, 2013 1:04 PM
To: Alberts, David; Daniel.Czelusniak@faa.gov; Stacey Zee/AWA/FAA
Cc: Hickens, David (JSC-JE111); WEBSTER, CHARLES F. (JSC-JE111)
Subject: Proposed Houston Spaceport

Dear Mr. Alberts;

Thank you for your letter dated 10/11 advising me of the spaceport the City of Houston is proposing at Ellington Airport. I appreciate that you also sent a letter to the Director of the Johnson Space Center (JSC) in Houston. I spoke to Dan this morning as I was a little surprised that your letters did not invite us to be a Cooperating Agency. It seems that RS&H may not have been aware that NASA is a major tenant at the airport. With NASA's Astronaut Corps based at JSC, NASA maintains several hangers and 20 T-38s at the airport to support their training. It's from this field that we fly our ISS crew over to Baikonur Cosmodrome— on a G-3 that also serves as one of several aircraft JSC uses for atmospheric research. Additionally, Ellington Field is where JSC homes the Super Guppy to support large cargo transportation needs of mission.

Please accept this email as my request to FAA and RS&H for NASA to serve as a Cooperating Agency on your NEPA document. If Dan has a MOA he needs to document this, it can be addressed to me. I've sincerely appreciated that FAA has involved NASA in the other proposed spaceports. My role is focused on HQ's been informed of spaceports being planned across the country that may involve or impact NASA, and specifically be informed of the resulting NEPA actions for each. For this specific spaceport, JSC should serve as your primary NASA point of contact, with Dave Hickens, JSC's NEPA Manager serving as our NEPA representative. He is supported by Charlie Webster (both copied) who will be able to provide you copy of the Environmental Resource Document (ERD) for Ellington Field. JSC maintains this as a NEPA resource baselining resource conditions.

I appreciate NASA being able to participate in and contribute to the NEPA documentation for this proposed spaceport.

Sincerely,
Tina Norwood
NASA NEPA Manager
(202) 358-7324

FEMA

U. S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX 76209-3698



FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION VI
MITIGATION DIVISION

**PUBLIC NOTICE REVIEW/ENVIRONMENTAL
CONSULTATION**

We have no comments to offer. We offer the following comments:

WE WOULD REQUEST THAT THE COUNTY FLOODPLAIN ADMINISTRATOR BE CONTACTED FOR THE REVIEW AND POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT.

If project is Federally funded, we would request project to be compliant with EO 11988 and 11990.

Joshua Stuckey
Permits Manager
Public Infrastructure Department
Harris County
10555 Northwest Freeway, Suite 120
Houston, TX 77092
josh.stuckey@hcpid.org
713-956-3016

REVIEWER: *Mayra G. Diaz*
Natural Hazards Program Specialist

DATE: October 29, 2013

If additional jurisdictions are involved in the project or if you have any questions, please contact me at 940-898-5541.



FEMA Continued



10748 Deerwood Park Blvd South
 Jacksonville, Florida 32256
 Voice 904 256 2500
 Fax 904 256 2502

10/11/13

Mr. Tony Robinson
 Regional Administrator
 Region 6
 Federal Emergency Management Agency
 800 North Loop 288
 Denton, TX 76209

No suspense

13-10-28483

Date Rec'd:	<i>10-17-13</i>	
Rec'd by:	<i>RNO</i>	
	Action	Info
RA		<input checked="" type="checkbox"/>
Deputy RA		<input checked="" type="checkbox"/>
XA		
Analyst		
RES		
REC		
MIT		<input checked="" type="checkbox"/>
MSD		
NP		
Grants		
File		<input checked="" type="checkbox"/>
Suspense Date:	<i>11-13-18</i>	

RE: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. Robinson:

The purpose of this letter is to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport (see **Attachment 1**).

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged RLVs at Ellington Airport. The Federal Aviation Administration, Office of Commercial Space Transportation (FAA/AST) will review the license application based on several factors, including the completion of an Environmental Assessment (EA). HAS selected RS&H to conduct the technical and analytical studies required for a launch site operator's license application, including the EA.

The Proposed Action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment, and other initial infrastructure (i.e., an oxidizer loading area) necessary to accommodate either a Concept X or Z vehicle and support equipment. The initial infrastructure would be sized to house either RLV and would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities. Should Ellington Airport need additional spaceport facilities beyond the Proposed Action, environmental approvals will be completed accordingly.

Attachment 2 shows examples and descriptions of the RLV concept vehicles. The winged RLVs would operate similarly to today's aircraft and use common fuels for propulsion, such as Jet A. The rockets used by the RLVs use refined kerosene similar to Jet A (RP-1) or solid hybrid fuels chemically similar to rubber or paraffin, and oxidizers such as liquid oxygen, nitrous oxide or hydrogen peroxide. No hypergols or other hazardous materials are used in these vehicles. At this time, it is anticipated that the RLVs would follow a southerly flight path toward the Gulf of Mexico to conduct its operation to suborbital altitudes (see **Attachment 3**).

FEMA Continued

10/11/13
Page 2 of 5

Proposed are approximately up to 50 total commercial RLV operations per year; significantly lower than the current number of aircraft operations at Ellington Airport (FAA Terminal Area Forecast - 2012 – approximately 145,000 total operations). The development of vehicle operating/safety areas and established operating procedures associated with the launch site operator's license application (14 CFR Part 420) will help to ensure the safety of the RLV and the uninvolved public.

In preparing the EA, RS&H will meet the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA); FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The EA will evaluate the potential direct, indirect, and cumulative environmental effects associated with the Proposed Action and analyze reasonable alternatives to the Proposed Action; including a No-Action Alternative.

On behalf of HAS, RS&H is sending this early notification letter to:

1. Advise you of the preparation of the EA;
2. Seek any relevant information you may have regarding the environment (e.g., human, natural, or physical) within the vicinity of Ellington Airport; and
3. Solicit early environmental comments and concerns regarding potential environmental, social, and economic issues for consideration during preparation of the EA.

We would appreciate any information and/or comments you would like to contribute. Your input will be useful to HAS, RS&H, and the FAA/AST for making the most informed decisions throughout the EA process. You may send (via post or email) information and/or comments by **November 11, 2013** to:

Reynolds, Smith and Hills, Inc.
Attn. David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597
David.Alberts@rsandh.com

Thank you for your interest in this project and we look forward to working with you as we prepare this EA. If you have any questions, or would like additional information regarding the Proposed Action, please do not hesitate to contact me.

Sincerely,



David E. Alberts
Southeast Region Environmental Service Group Leader

Attachments: Attachment 1 – Location Map
Attachment 2 – Example of Concept X and Z Vehicles
Attachment 3 – Sample Flight Path

Cc: Arturo Machuca, Houston Airport System
Carlos Ortiz, Houston Airport System
Dan Czelusniak, FAA/AST
File

Texas Commission on Environmental Quality

Bryan W. Shaw, Ph.D., P.E., *Chairman*
 Toby Baker, *Commissioner*
 Zak Covar, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 29, 2013



Mr. David E. Alberts
 Southeast Region Environmental Service Group Leader
 Reynolds, Smith and Hills, Inc.
 10748 Deerwood Park Boulevard South
 Jacksonville, FL 32256-0597

Re: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. Alberts:

This is in response to your letter dated October 11, 2013, requesting preliminary information regarding environmental impacts and permits associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport. In your letter, you indicated that the proposed action will include the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment and other initial infrastructure necessary to accommodate a vehicle and support equipment, and that the initial infrastructure would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities.

On behalf of the Stormwater and Pretreatment Team within the Water Permits Division of the Texas Commission on Environmental Quality (TCEQ), I appreciate the opportunity to provide you with the requested information as it relates to the provisions and requirements of 30 Texas Administrative Code (TAC) Chapter 308.

Industrial facilities may be required to obtain two types of stormwater permits under the Texas Pollution Discharge Elimination System (TPDES): one for the operation phase and one for the construction phase.

Operation Phase

The need for a permit and the eligibility for coverage are determined by the facility's primary Standard Industrial Classification (SIC) code or by an Industrial Activity Code. Operators of facilities with a primary SIC code, or any Industrial Activity Code included in Part II Section A of the Multi-Sector General Permit (MSGP) (TXR050000), must obtain authorization for discharges of stormwater associated with industrial activity. To the extent that this facility is classified under any of the following primary SIC codes: 4512 (Air Transportation, Scheduled), 4513 (Air Courier Services), 4522 (Air Transportation, Non-scheduled), or 4581 (Airports, Flying Fields, and Airport Terminal Services, including aircraft maintenance and fueling), it would be subject to Sector S: Air Transportation Facilities under the MSGP. However, a final determination needs to be made once an SIC code for the facility is made available.

P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • tceq.texas.gov

How is our customer service? tceq.texas.gov/customersurvey
 printed on recycled paper

Texas Commission on Environmental Quality Continued

Mr. David E. Alberts
Southeast Region Environmental Service Group Leader
Page 2
October 29, 2013

This permit however, does not authorize discharges of any process wastewater from material storage or handling areas, including contaminated stormwater. A separate individual Texas Pollutant Discharge Elimination System (TPDES) permit must be obtained for those discharges to ensure protection of water quality.

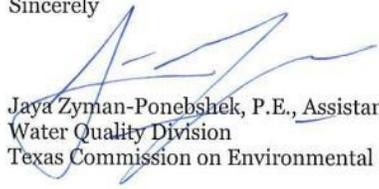
However, even if a stormwater permit for industrial activities is not required, the facility is still required to comply with all the requirements of the Clean Water Act (CWA) and the Texas Water Code (TWC). If any stormwater discharge violates the CWA or the TWC, the facility would then be required to obtain an individual stormwater discharge permit.

Construction Phase

Stormwater discharges associated with construction activities from large and small sites require authorization under the General Construction Permit (GCP) TXR150000. If the proposed construction is going to disturb more than five acres, a Notice of Intent (NOI) needs to be submitted to TCEQ to seek coverage under the GCP. As part of this permit, the operator must prepare and implement a stormwater pollution plan (SWPPP). If the disturbance is less than five (5) acres, but more than one (1) acre, a NOI is not necessary; however a SWPPP still needs to be prepared and implemented. If the disturbance is less than one (1) acre, no construction stormwater permit is required.

Information about stormwater permitting requirements may be obtained from the TCEQ website at: <http://www.tceq.state.tx.us> or for additional information on the TPDES stormwater permitting program, please visit the TCEQ website at: http://www.tceq.texas.gov/permitting/stormwater/sw_permits.html as well as from the staff of the Wastewater Permitting Section, Stormwater Team at (512) 239-4671. If you have other questions related to this matter, you can contact Ms. Rebecca L. Villalba, Team Leader of the Stormwater and Pretreatment Team by phone at (512) 239-4784, by email at rebecca.villalba@tceq.texas.gov or by mail at the address provided on the letterhead.

Sincerely



Jaya Zyman-Ponebshek, P.E., Assistant Director
Water Quality Division
Texas Commission on Environmental Quality

U.S. Fish and Wildlife Service



10748 Deerwood Park Blvd South
Jacksonville, Florida 32256
Voice 904 256 2500
Fax 904 256 2502



10/11/13

Mr. Edith Erfling
Project Leader
Ecological Services Field Office
U.S. Fish and Wildlife Service
17629 El Camino Real, #211
Houston, TX 77058

RE: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. Erfling:

The purpose of this letter is to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport (see **Attachment 1**).

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged RLVs at Ellington Airport. The Federal Aviation Administration, Office of Commercial Space Transportation (FAA/AST) will review the license application based on several factors, including the completion of an Environmental Assessment (EA). HAS selected RS&H to conduct the technical and analytical studies required for a launch site operator's license application, including the EA.

The Proposed Action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment, and other initial infrastructure (i.e., an oxidizer loading area) necessary to accommodate either a Concept X or Z vehicle and support equipment. The initial infrastructure would be sized to house either RLV and would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities. Should Ellington Airport need additional spaceport facilities beyond the Proposed Action, environmental approvals will be completed accordingly.

Attachment 2 shows examples and descriptions of the RLV concept vehicles. The winged RLVs would operate similarly to today's aircraft and use common fuels for propulsion, such as Jet A. The rockets used by the RLVs use refined kerosene similar to Jet A (RP-1) or solid hybrid fuels chemically similar to rubber or paraffin, and oxidizers such as liquid oxygen, nitrous oxide or hydrogen peroxide. No hypergols or other hazardous materials are used in these vehicles. At this time, it is anticipated that the RLVs would follow a southerly flight path toward the Gulf of Mexico to conduct its operation to suborbital altitudes (see **Attachment 3**).

U.S. Fish and Wildlife Service Continued

10/11/13
Page 2 of 5

Proposed are approximately up to 50 total commercial RLV operations per year; significantly lower than the current number of aircraft operations at Ellington Airport (FAA Terminal Area Forecast - 2012 - approximately 145,000 total operations). The development of vehicle operating/safety areas and established operating procedures associated with the launch site operator's license application (14 CFR Part 420) will help to ensure the safety of the RLV and the uninvolved public.

In preparing the EA, RS&H will meet the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA); FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The EA will evaluate the potential direct, indirect, and cumulative environmental effects associated with the Proposed Action and analyze reasonable alternatives to the Proposed Action; including a No-Action Alternative.

On behalf of HAS, RS&H is sending this early notification letter to:

1. Advise you of the preparation of the EA;
2. Seek any relevant information you may have regarding the environment (e.g., human, natural, or physical) within the vicinity of Ellington Airport; and
3. Solicit early environmental comments and concerns regarding potential environmental, social, and economic issues for consideration during preparation of the EA.

We would appreciate any information and/or comments you would like to contribute. Your input will be useful to HAS, RS&H, and the FAA/AST for making the most informed decisions throughout the EA process. You may send (via post or email) information and/or comments by **November 11, 2013** to:

Reynolds, Smith and Hills, Inc.
Attn. David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597
David.Alberts@rsandh.com

Thank you for your interest in this project and we look forward to working with you as we prepare this EA. If you have any questions, or would like additional information regarding the Proposed Action, please do not hesitate to contact me.

Sincerely,



David E. Alberts
Southeast Region Environmental Service Group Leader

Attachments: Attachment 1 – Location Map
Attachment 2 – Example of Concept X and Z Vehicles
Attachment 3 – Sample Flight Path

Cc: Arturo Machuca, Houston Airport System
Carlos Ortiz, Houston Airport System
Dan Czelusniak, FAA/AST
File

U.S. Fish and Wildlife Service Continued



In Reply Refer To:
FWS/R2/CLES/

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
17629 El Camino Real, Suite 211
Houston, Texas 77058
281/286-8282 / (FAX) 281/488-5882



March 2013

Thank you for your request for threatened and endangered species, fish and wildlife, environmental, and/or aquatic resources information, comments, and/or recommendations within the United States Fish and Wildlife Service (Service) Clear Lake Ecological Service's area of responsibility. Our comments are provided in accordance with the provisions of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. 661-667(c)), and the National Environmental Policy Act (42 U.S.C. §4321-4347 et seq.).

Endangered Species Act

The ESA and Federal regulations prohibit "take" of threatened or endangered species of fish and wildlife within the U.S. or its territorial waters. Please note that "take" is defined to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." A county-by-county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://www.fws.gov/southwest/es/ES_Lists_Main.cfm.

Section 7 of the ESA

According to Section 7(a)(2) of the ESA, it is the responsibility of each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species. As such, Federal agencies are required to consult with the Service if it appears that any action they are proposing "may affect" a listed species.

To evaluate a project for its potential effect(s) to listed species, project proponents should use the county-by-county listing and other current species information¹ to determine whether habitat for a listed species is present at the project site. If potential habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present. After completing a habitat evaluation and/or any necessary surveys, project proponents should evaluate the project for potential effects² to listed species and make one of the following determinations:

No effect – the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with the Service is necessary. However, if the project changes or

¹ For information regarding habitat requirements of federally listed species please visit <http://ecos.fws.gov/>.

² The effects of any action under Section 7 should be analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. Therefore, if your proposed action(s) is part of and depends on a separate action for its justification, or has no independent utility apart from the separate action, then it should be considered interrelated or interdependent and should be analyzed under Section 7 of the ESA.

U.S. Fish and Wildlife Service Continued

additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Is not likely to adversely affect – the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable (extremely unlikely to occur), insignificant (can't be measured or detected), or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. You should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect – adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action “is likely to adversely affect” the listed species. An “is likely to adversely affect” determination requires the Federal action agency to initiate formal Section 7 consultation with the Service.

Regardless of the determination, the Service recommends developing a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling ESA requirements for your projects at http://www.fws.gov/ endangered/esa-library/pdf/esa_section7_handbook.pdf.

Section 10 of the ESA

Projects that do not involve a federal nexus can be evaluated under Section 10 of the ESA. If “incidental take” of a listed species is likely to occur during a proposed non-federal activity, then the project sponsor or landowner may apply for an incidental take permit under Section 10 of the ESA. Please see the following links for further guidance on Section 10 <http://www.fws.gov/endangered/permits/index.html> and http://www.fws.gov/southwest/es/AustinTexas/ESA_HCP_FAQs.html.

Candidate Species

Freshwater Mussels

The following species of mussels occur in Texas and are candidates for listing under the ESA: Texas fatmucket *Lampsilis bracteata*, golden orb *Quadrula aurea*, smooth pimpleback *Quadrula houstonensis*, Texas pimpleback *Quadrula petrina*, and Texas fawnsfoot *Truncilla macrodon*. We are also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends

U.S. Fish and Wildlife Service Continued

that that you implement the best management practices within the enclosed document entitled *Best Management Practices for Projects Affecting, Rivers, Streams and Tributaries*.

Candidate Conservation Agreements

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at <http://www.fws.gov/endangered/what-we-do/eca.html>.

Migratory Birds

The MBTA protects all native migratory birds and prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, and parts, except when specifically permitted by regulations for specific intentional uses. A list of birds protected under the MBTA can be found in 50 CFR 10 of the MBTA and at <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html>. Activities that have the potential to take migratory birds as well as recommendations for reducing such take include:

Utility Lines

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new lines and/or the modification, maintenance, and update of old lines, we recommend that you implement the Avian Protection Plan guidelines for power lines found at <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

Communication Towers

Telecommunication towers are estimated to kill millions of birds per year. We recommend that you implement the guidance in *Service Guidance on Siting, Construction, Operation, and Decommissioning of Communication Towers*. This guidance can be found at <http://www.fws.gov/habitatconservation/communicationtowers.html>.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files.

Land Clearing

Land clearing work can destroy active nests (eggs or young present) and kill birds. The Service recommends you review and implement the conservation actions for migratory birds outlined in the enclosed document entitled *Suggested Priority for Migratory Bird Conservation Actions for Projects*.

Colonial Water Bird Rookeries

Disturbance from construction activities and project operations can adversely affect breeding bird use of nesting sites and can result in nest abandonment and loss of reproduction. We recommend that

U.S. Fish and Wildlife Service Continued

project activities do not occur within 1,000 feet of colonial waterbird rookeries during the nesting season from February 15 to September 1.

Bald Eagles

The bald eagle *Haliaeetus leucocephalus* is protected by the BGEPA and the MBTA. Accordingly, the Service recommends that project proponents use the *National Bald Eagle Management Guidelines* to avoid and minimize harm and disturbance of bald eagles. These guidelines can be found at <http://www.fws.gov/migratorybirds/BaldAndGoldenEagleManagement.htm>. Eagles are particularly vulnerable to disturbance throughout the nesting season, which in Texas is generally from October 1 to May 30.

Wetlands, Streams, and Other Aquatic Resources

Numerous projects along the Texas coast often impact wetlands, streams, or other aquatic resources or require work in a navigable waterway. Section 404 of the Clean Water Act regulates the discharge of fill material into waters of the U.S. (e.g., wetlands and streams) and Section 10 of the Rivers and Harbors Act of 1899 regulates work and/or structures within navigable waterways. The U.S. Army Corps of Engineers (Corps) is tasked with administering these regulations and we recommend that you coordinate your activities with the Corps for proper permitting and compliance with these regulations.

Thank you for the opportunity to provide comments on your project. If you need any additional information, you can contact one of our biologists (Donna Anderson, Moni Belton, Kelsey Gocke, Jeff Hill, Charrish Stevens, or Arturo Vale) at 281/286-8282.

Sincerely,



Edith Erling
Field Supervisor

Enclosures

U.S. Fish and Wildlife Service Continued**Suggested Priority of Migratory Bird Conservation Actions for Projects
U.S. Fish and Wildlife Service (USFWS), Migratory Bird Management****March 9, 2010**

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.
2. Determine if the proposed project or action will involve below- and/or above-ground construction activities since recommended practices and timing of surveys and clearances could differ accordingly.
3. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Also, eagles may initiate nesting as early as late December or January depending on the geographic area. Due to this variability, project proponents should consult with the appropriate Regional Migratory Bird Program (USFWS) for specific nesting seasons. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible. Always avoid any habitat alteration, removal, or destruction during the primary nesting season for migratory birds. Additionally, clearing of vegetation in the year prior to construction (but not within the nesting season) may discourage birds from attempting to nest in the proposed construction area, thereby decreasing chance of take during construction activities.
4. If a proposed project or action includes the potential for take of migratory birds and/or the loss or degradation of migratory bird habitat and work cannot occur outside the migratory bird nesting season (either the primary or maximum nesting season), project proponents will need to provide the USFWS with an explanation for why work has to occur during the migratory bird nesting season. Further, in these cases, project proponents also need to demonstrate that all efforts to complete work outside the migratory bird nesting season were attempted, and that the reasons work needs to be completed during the nesting season were beyond the proponent's control.

Also, where project work cannot occur outside the migratory bird nesting season, project proponents must survey those portions of the project area during the nesting season prior to construction occurring to determine if migratory birds are present and nesting in those areas. In addition to conducting surveys during the

U.S. Fish and Wildlife Service Continued

nesting season/construction phase, companies may also benefit from conducting surveys during the prior nesting season. Such surveys will assist the company in any decisions about the likely presence of nesting migratory birds or sensitive species in the proposed project or work area. While individual migratory birds will not necessarily return to nest at the exact site as in previous years, a survey in the nesting season in the year before construction allows the company to become familiar with species and numbers present in the project area well before the nesting season in the year of construction. Bird surveys should be completed during the nesting season in the best biological timeframe for detecting the presence of nesting migratory birds, using accepted bird survey protocols. USFWS Offices can be contacted for recommendations on appropriate survey guidance. Project proponents should also be aware that results of migratory bird surveys are subject to spatial and temporal variability. Finally, project proponents will need to conduct migratory bird surveys during the actual year of construction, if they cannot avoid work during the primary nesting season (see above) and if construction will impact habitats suitable for supporting nesting birds.

5. If no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.
6. If migratory birds are present and nesting in the proposed project or action area, contact your nearest USFWS Ecological Services Field Office and USFWS Region Migratory Birds Program for guidance as to appropriate next steps to take to minimize impacts to migratory birds associated with the proposed project or action.

* Note: these proposed conservation measures assume that there are no Endangered or Threatened migratory bird species present in the project/action area, or any other Endangered or Threatened animal or plant species present in this area. If Endangered or Threatened species are present, or they could potentially be present, and the project/action may affect these species, then consult with your nearest USFWS Ecological Services Office before proceeding with any project/action.

** The Migratory Bird Treaty Act prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the Act has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during construction and operation of energy infrastructure, even if all known reasonable and effective measures to protect birds are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve

U.S. Fish and Wildlife Service Continued

individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent and effective measures to avoid that take. Companies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

*** Also note that Bald and Golden Eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any Bald or Golden Eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. Further, activities that would disturb Bald or Golden Eagles are prohibited under BGEPA. "Disturb" means to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an Eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. If a proposed project or action would occur in areas where nesting, feeding, or roosting eagles occur, then project proponents may need to take additional conservation measures to achieve compliance with BGEPA. New regulations (50 CFR § 22.26 and § 22.27) allow the take of bald and golden eagles and their nests, respectively, to protect interests in a particular locality. However, consultation with the Migratory Bird, Ecological Services, and Law Enforcement programs of the Service will be required before a permit may be issued.

U.S. Fish and Wildlife Service Continued**BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTING RIVERS, STREAMS AND TRIBUTARIES**

The project crosses or potentially affects river, stream or tributary aquatic habitat. Therefore the Service recommends implementing the following applicable Best Management Practices:

1. Construct stream crossings during a period of low streamflow (e.g., July - September);
2. Cross streams, stream banks and riparian zones at right angles and at gentle slopes;
3. When feasible, directionally bore under stream channels;
4. Disturb riparian and floodplain vegetation only when necessary;
5. Construction equipment should cross the stream at one confined location over an existing bridge, equipment pads, clean temporary native rock fill, or over a temporary portable bridge;
6. Limit in-stream equipment use to that needed to construct crossings;
7. Place trench spoil at least 25 feet away landward from streambanks;
8. Use sediment filter devices to prevent movement of spoil off right-of-way when standing or flowing water is present;
9. Trench de-watering, as necessary, should be conducted to prevent discharge of silt laden water into the stream channel;
10. Maintain the current contours of the bank and channel bottom;
11. Do not store hazardous materials, chemicals, fuels, lubricating oils, and other such substances within 100 feet of streambanks;
12. Refuel construction equipment at least 100 feet from streambanks;
13. Revegetate all disturbed areas as soon as possible after construction to prevent unnecessary soil erosion. Use only native riparian plants to help prevent the spread of exotics;
14. Maintain sediment filters at the base of all slopes located adjacent to the streams until right-of-way vegetation becomes established;
15. Maintain a vegetative filtration strip adjacent to streams and wetlands. The width of a filter strip is based on the slope of the banks and the width of the stream. Guidance to determine the appropriate filter strip (stream management zone, SMZ) width is provided below; and
16. Direct water runoff into vegetated areas.

BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTING RIVERS, STREAMS AND TRIBUTARIES. Document prepared by the U.S. Fish and Wildlife Service, Oklahoma Ecological Services Field Office, 9014 East 21st Street, Tulsa, Oklahoma 74129-1428. For the most recent information visit our website, <http://www.fws.gov/southwest/es/oklahoma/default.htm>, write, or call (918) 581-7458. 1/24/2007

U.S. Fish and Wildlife Service Continued

2

SMZ widths should consider watershed characteristics, risk of erosion, soil type, and stream width. SMZ widths are measured from the top of each bank and established on each side of the stream. Erosion risk is increased with sandy soil, steep slopes, large watersheds and increasing stream widths. Recommended primary and secondary SMZ widths are provided in the table below.

Stream Width (Feet)	Slope (Percent)	Primary SMZ (Feet)	Secondary SMZ (Feet)
<20	<7	35	0
<20	7-20	35	50
<20	>20	Top of slope or 150	75
20-50	<7	50	0
20-50	7-20	50	50
20-50	>20	Top of slope or 150	75
>50	<7	Width of stream or 100 max.	0
>50	7-20	Width of stream or 100 max.	50
>50	>20	Top of slope or 150	75

Reference

Arkansas Forestry Commission. 2001. Draft Arkansas Forestry Best Management Practices for Water Quality Protection.

U.S. Fish and Wildlife Service



10748 Deerwood Park Blvd South
 Jacksonville, Florida 32256
 Voice 904 256 2500
 Fax 904 256 2502

10/11/13

Mr. Denise Baker
 NEPA Regional Coordinator
 Southwest Region
 U.S. Fish and Wildlife Service
 P.O. Box 1306
 Albuquerque, NM 87103

RE: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. Baker:

The purpose of this letter is to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport (see **Attachment 1**).

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged RLVs at Ellington Airport. The Federal Aviation Administration, Office of Commercial Space Transportation (FAA/AST) will review the license application based on several factors, including the completion of an Environmental Assessment (EA). HAS selected RS&H to conduct the technical and analytical studies required for a launch site operator's license application, including the EA.

The Proposed Action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment, and other initial infrastructure (i.e., an oxidizer loading area) necessary to accommodate either a Concept X or Z vehicle and support equipment. The initial infrastructure would be sized to house either RLV and would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities. Should Ellington Airport need additional spaceport facilities beyond the Proposed Action, environmental approvals will be completed accordingly.

Attachment 2 shows examples and descriptions of the RLV concept vehicles. The winged RLVs would operate similarly to today's aircraft and use common fuels for propulsion, such as Jet A. The rockets used by the RLVs use refined kerosene similar to Jet A (RP-1) or solid hybrid fuels chemically similar to rubber or paraffin, and oxidizers such as liquid oxygen, nitrous oxide or hydrogen peroxide. No hypergols or other hazardous materials are used in these vehicles. At this time, it is anticipated that the RLVs would follow a southerly flight path toward the Gulf of Mexico to conduct its operation to suborbital altitudes (see **Attachment 3**).



Forward to Coastal
ESFO



U.S. Fish and Wildlife Service Continued

10/11/13
Page 2 of 5

Proposed are approximately up to 50 total commercial RLV operations per year; significantly lower than the current number of aircraft operations at Ellington Airport (FAA Terminal Area Forecast - 2012 – approximately 145,000 total operations). The development of vehicle operating/safety areas and established operating procedures associated with the launch site operator's license application (14 CFR Part 420) will help to ensure the safety of the RLV and the uninvolved public.

In preparing the EA, RS&H will meet the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA); FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The EA will evaluate the potential direct, indirect, and cumulative environmental effects associated with the Proposed Action and analyze reasonable alternatives to the Proposed Action; including a No-Action Alternative.

On behalf of HAS, RS&H is sending this early notification letter to:

1. Advise you of the preparation of the EA;
2. Seek any relevant information you may have regarding the environment (e.g., human, natural, or physical) within the vicinity of Ellington Airport; and
3. Solicit early environmental comments and concerns regarding potential environmental, social, and economic issues for consideration during preparation of the EA.

We would appreciate any information and/or comments you would like to contribute. Your input will be useful to HAS, RS&H, and the FAA/AST for making the most informed decisions throughout the EA process. You may send (via post or email) information and/or comments by **November 11, 2013** to:

Reynolds, Smith and Hills, Inc.
Attn. David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597
David.Alberts@rsandh.com

Thank you for your interest in this project and we look forward to working with you as we prepare this EA. If you have any questions, or would like additional information regarding the Proposed Action, please do not hesitate to contact me.

Sincerely,



David E. Alberts
Southeast Region Environmental Service Group Leader

Attachments: Attachment 1 – Location Map
Attachment 2 – Example of Concept X and Z Vehicles
Attachment 3 – Sample Flight Path

Cc: Arturo Machuca, Houston Airport System
Carlos Ortiz, Houston Airport System
Dan Czelusniak, FAA/AST
File

U.S. Fish and Wildlife Service Continued



In Reply Refer To:
FWS/R2/CLES/

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
17629 El Camino Real, Suite 211
Houston, Texas 77058
281/286-8282 / (FAX) 281/488-5882



March 2013

Thank you for your request for threatened and endangered species, fish and wildlife, environmental, and/or aquatic resources information, comments, and/or recommendations within the United States Fish and Wildlife Service (Service) Clear Lake Ecological Service's area of responsibility. Our comments are provided in accordance with the provisions of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. 661-667(c)), and the National Environmental Policy Act (42 U.S.C. §4321-4347 et seq.).

Endangered Species Act

The ESA and Federal regulations prohibit "take" of threatened or endangered species of fish and wildlife within the U.S. or its territorial waters. Please note that "take" is defined to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." A county-by-county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://www.fws.gov/southwest/es/ES_Lists_Main.cfm.

Section 7 of the ESA

According to Section 7(a)(2) of the ESA, it is the responsibility of each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species. As such, Federal agencies are required to consult with the Service if it appears that any action they are proposing "may affect" a listed species.

To evaluate a project for its potential effect(s) to listed species, project proponents should use the county-by-county listing and other current species information¹ to determine whether habitat for a listed species is present at the project site. If potential habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present. After completing a habitat evaluation and/or any necessary surveys, project proponents should evaluate the project for potential effects² to listed species and make one of the following determinations:

No effect – the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with the Service is necessary. However, if the project changes or

¹ For information regarding habitat requirements of federally listed species please visit <http://ecos.fws.gov/>.

² The effects of any action under Section 7 should be analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. Therefore, if your proposed action(s) is part of and depends on a separate action for its justification, or has no independent utility apart from the separate action, then it should be considered interrelated or interdependent and should be analyzed under Section 7 of the ESA.

U.S. Fish and Wildlife Service Continued

additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Is not likely to adversely affect – the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable (extremely unlikely to occur), insignificant (can't be measured or detected), or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. You should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect – adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action “is likely to adversely affect” the listed species. An “is likely to adversely affect” determination requires the Federal action agency to initiate formal Section 7 consultation with the Service.

Regardless of the determination, the Service recommends developing a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling ESA requirements for your projects at http://www.fws.gov/angered/esa-library/pdf/esa_section7_handbook.pdf.

Section 10 of the ESA

Projects that do not involve a federal nexus can be evaluated under Section 10 of the ESA. If “incidental take” of a listed species is likely to occur during a proposed non-federal activity, then the project sponsor or landowner may apply for an incidental take permit under Section 10 of the ESA. Please see the following links for further guidance on Section 10 <http://www.fws.gov/angered/permits/index.html> and http://www.fws.gov/southwest/es/AustinTexas/ESA_HCP_FAQs.html.

Candidate Species

Freshwater Mussels

The following species of mussels occur in Texas and are candidates for listing under the ESA: Texas fatmucket *Lampsilis bracteata*, golden orb *Quadrula aurea*, smooth pimpleback *Quadrula houstonensis*, Texas pimpleback *Quadrula petrina*, and Texas fawnsfoot *Truncilla macrodon*. We are also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends

U.S. Fish and Wildlife Service Continued

that that you implement the best management practices within the enclosed document entitled *Best Management Practices for Projects Affecting, Rivers, Streams and Tributaries*.

Candidate Conservation Agreements

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at <http://www.fws.gov/endangered/what-we-do/cca.html>.

Migratory Birds

The MBTA protects all native migratory birds and prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, and parts, except when specifically permitted by regulations for specific intentional uses. A list of birds protected under the MBTA can be found in 50 CFR 10 of the MBTA and at <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html>. Activities that have the potential to take migratory birds as well as recommendations for reducing such take include:

Utility Lines

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new lines and/or the modification, maintenance, and update of old lines, we recommend that you implement the Avian Protection Plan guidelines for power lines found at <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

Communication Towers

Telecommunication towers are estimated to kill millions of birds per year. We recommend that you implement the guidance in *Service Guidance on Siting, Construction, Operation, and Decommissioning of Communication Towers*. This guidance can be found at <http://www.fws.gov/habitatconservation/communicationtowers.html>.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files.

Land Clearing

Land clearing work can destroy active nests (eggs or young present) and kill birds. The Service recommends you review and implement the conservation actions for migratory birds outlined in the enclosed document entitled *Suggested Priority for Migratory Bird Conservation Actions for Projects*.

Colonial Water Bird Rookeries

Disturbance from construction activities and project operations can adversely affect breeding bird use of nesting sites and can result in nest abandonment and loss of reproduction. We recommend that

U.S. Fish and Wildlife Service Continued

project activities do not occur within 1,000 feet of colonial waterbird rookeries during the nesting season from February 15 to September 1.

Bald Eagles

The bald eagle *Haliaeetus leucocephalus* is protected by the BGEPA and the MBTA. Accordingly, the Service recommends that project proponents use the *National Bald Eagle Management Guidelines* to avoid and minimize harm and disturbance of bald eagles. These guidelines can be found at <http://www.fws.gov/migratorybirds/BaldAndGoldenEagleManagement.htm>. Eagles are particularly vulnerable to disturbance throughout the nesting season, which in Texas is generally from October 1 to May 30.

Wetlands, Streams, and Other Aquatic Resources

Numerous projects along the Texas coast often impact wetlands, streams, or other aquatic resources or require work in a navigable waterway. Section 404 of the Clean Water Act regulates the discharge of fill material into waters of the U.S. (e.g., wetlands and streams) and Section 10 of the Rivers and Harbors Act of 1899 regulates work and/or structures within navigable waterways. The U.S. Army Corps of Engineers (Corps) is tasked with administering these regulations and we recommend that you coordinate your activities with the Corps for proper permitting and compliance with these regulations.

Thank you for the opportunity to provide comments on your project. If you need any additional information, you can contact one of our biologists (Donna Anderson, Moni Belton, Kelsey Gocke, Jeff Hill, Charrish Stevens, or Arturo Vale) at 281/286-8282.

Sincerely,



Edith Erling
Field Supervisor

Enclosures

U.S. Fish and Wildlife Service Continued**Suggested Priority of Migratory Bird Conservation Actions for Projects
U.S. Fish and Wildlife Service (USFWS), Migratory Bird Management****March 9, 2010**

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.
2. Determine if the proposed project or action will involve below- and/or above-ground construction activities since recommended practices and timing of surveys and clearances could differ accordingly.
3. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Also, eagles may initiate nesting as early as late December or January depending on the geographic area. Due to this variability, project proponents should consult with the appropriate Regional Migratory Bird Program (USFWS) for specific nesting seasons. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible. Always avoid any habitat alteration, removal, or destruction during the primary nesting season for migratory birds. Additionally, clearing of vegetation in the year prior to construction (but not within the nesting season) may discourage birds from attempting to nest in the proposed construction area, thereby decreasing chance of take during construction activities.
4. If a proposed project or action includes the potential for take of migratory birds and/or the loss or degradation of migratory bird habitat and work cannot occur outside the migratory bird nesting season (either the primary or maximum nesting season), project proponents will need to provide the USFWS with an explanation for why work has to occur during the migratory bird nesting season. Further, in these cases, project proponents also need to demonstrate that all efforts to complete work outside the migratory bird nesting season were attempted, and that the reasons work needs to be completed during the nesting season were beyond the proponent's control.

Also, where project work cannot occur outside the migratory bird nesting season, project proponents must survey those portions of the project area during the nesting season prior to construction occurring to determine if migratory birds are present and nesting in those areas. In addition to conducting surveys during the

U.S. Fish and Wildlife Service Continued

nesting season/construction phase, companies may also benefit from conducting surveys during the prior nesting season. Such surveys will assist the company in any decisions about the likely presence of nesting migratory birds or sensitive species in the proposed project or work area. While individual migratory birds will not necessarily return to nest at the exact site as in previous years, a survey in the nesting season in the year before construction allows the company to become familiar with species and numbers present in the project area well before the nesting season in the year of construction. Bird surveys should be completed during the nesting season in the best biological timeframe for detecting the presence of nesting migratory birds, using accepted bird survey protocols. USFWS Offices can be contacted for recommendations on appropriate survey guidance. Project proponents should also be aware that results of migratory bird surveys are subject to spatial and temporal variability. Finally, project proponents will need to conduct migratory bird surveys during the actual year of construction, if they cannot avoid work during the primary nesting season (see above) and if construction will impact habitats suitable for supporting nesting birds.

5. If no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.
6. If migratory birds are present and nesting in the proposed project or action area, contact your nearest USFWS Ecological Services Field Office and USFWS Region Migratory Birds Program for guidance as to appropriate next steps to take to minimize impacts to migratory birds associated with the proposed project or action.

* Note: these proposed conservation measures assume that there are no Endangered or Threatened migratory bird species present in the project/action area, or any other Endangered or Threatened animal or plant species present in this area. If Endangered or Threatened species are present, or they could potentially be present, and the project/action may affect these species, then consult with your nearest USFWS Ecological Services Office before proceeding with any project/action.

** The Migratory Bird Treaty Act prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the Act has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during construction and operation of energy infrastructure, even if all known reasonable and effective measures to protect birds are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve

U.S. Fish and Wildlife Service Continued

individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent and effective measures to avoid that take. Companies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

*** Also note that Bald and Golden Eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any Bald or Golden Eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. Further, activities that would disturb Bald or Golden Eagles are prohibited under BGEPA. "Disturb" means to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an Eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. If a proposed project or action would occur in areas where nesting, feeding, or roosting eagles occur, then project proponents may need to take additional conservation measures to achieve compliance with BGEPA. New regulations (50 CFR § 22.26 and § 22.27) allow the take of bald and golden eagles and their nests, respectively, to protect interests in a particular locality. However, consultation with the Migratory Bird, Ecological Services, and Law Enforcement programs of the Service will be required before a permit may be issued.

U.S. Fish and Wildlife Service Continued**BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTING RIVERS, STREAMS AND TRIBUTARIES**

The project crosses or potentially affects river, stream or tributary aquatic habitat. Therefore the Service recommends implementing the following applicable Best Management Practices:

1. Construct stream crossings during a period of low streamflow (e.g., July - September);
2. Cross streams, stream banks and riparian zones at right angles and at gentle slopes;
3. When feasible, directionally bore under stream channels;
4. Disturb riparian and floodplain vegetation only when necessary;
5. Construction equipment should cross the stream at one confined location over an existing bridge, equipment pads, clean temporary native rock fill, or over a temporary portable bridge;
6. Limit in-stream equipment use to that needed to construct crossings;
7. Place trench spoil at least 25 feet away landward from streambanks;
8. Use sediment filter devices to prevent movement of spoil off right-of-way when standing or flowing water is present;
9. Trench de-watering, as necessary, should be conducted to prevent discharge of silt laden water into the stream channel;
10. Maintain the current contours of the bank and channel bottom;
11. Do not store hazardous materials, chemicals, fuels, lubricating oils, and other such substances within 100 feet of streambanks;
12. Refuel construction equipment at least 100 feet from streambanks;
13. Revegetate all disturbed areas as soon as possible after construction to prevent unnecessary soil erosion. Use only native riparian plants to help prevent the spread of exotics;
14. Maintain sediment filters at the base of all slopes located adjacent to the streams until right-of-way vegetation becomes established;
15. Maintain a vegetative filtration strip adjacent to streams and wetlands. The width of a filter strip is based on the slope of the banks and the width of the stream. Guidance to determine the appropriate filter strip (stream management zone, SMZ) width is provided below; and
16. Direct water runoff into vegetated areas.

BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTING RIVERS, STREAMS AND TRIBUTARIES. Document prepared by the U.S. Fish and Wildlife Service, Oklahoma Ecological Services Field Office, 9014 East 21st Street, Tulsa, Oklahoma 74129-1428. For the most recent information visit our website, <http://www.fws.gov/southwest/es/oklahoma/default.htm>, write, or call (918) 581-7458. 1/24/2007

U.S. Fish and Wildlife Service Continued

2

SMZ widths should consider watershed characteristics, risk of erosion, soil type, and stream width. SMZ widths are measured from the top of each bank and established on each side of the stream. Erosion risk is increased with sandy soil, steep slopes, large watersheds and increasing stream widths. Recommended primary and secondary SMZ widths are provided in the table below.

Stream Width (Feet)	Slope (Percent)	Primary SMZ (Feet)	Secondary SMZ (Feet)
<20	<7	35	0
<20	7-20	35	50
<20	>20	Top of slope or 150	75
20-50	<7	50	0
20-50	7-20	50	50
20-50	>20	Top of slope or 150	75
>50	<7	Width of stream or 100 max.	0
>50	7-20	Width of stream or 100 max.	50
>50	>20	Top of slope or 150	75

Reference

Arkansas Forestry Commission. 2001. Draft Arkansas Forestry Best Management Practices for Water Quality Protection.

Flying Tigers

Deschappelles, Natalie

From: Alberts, David
Sent: Wednesday, November 06, 2013 12:57 PM
To: Deschappelles, Natalie
Subject: FW: Proposed Houston Spaceport at Ellington Field

Please add this to the EA's correspondence appendix.

David E. Alberts

Southeast Region Environmental Service Group Leader
10748 Deerwood Park Blvd South
Jacksonville, FL 32256-0597
Phone: 904-256-2469 / Fax: 800-464-4358
David.Alberts@rsandh.com

Visit our website at www.rsandh.com
Connect with RS&H on [Facebook](#) [Twitter](#) [LinkedIn](#)



From: Helene McCorvey [<mailto:helene.m@sbcglobal.net>]
Sent: Tuesday, November 05, 2013 12:26 PM
To: Alberts, David
Subject: Proposed Houston Spaceport at Ellington Field

Comments/Questions:

Will there be a TFR for each launch?

What are the impacts to flight school ops?

taxi?
tie downs?
security?

Helene L. McCorvey, Owner
Flying Tigers

National Park Service

Deschappelles, Natalie

From: Alberts, David
Sent: Tuesday, November 05, 2013 10:09 AM
To: Deschappelles, Natalie
Subject: FW: Houston Spaceport EA - early coordination packet

Please add to the Houston Spaceport EA – Agency Coordination. Thanks.

From: david_hurd@nps.gov [mailto:david_hurd@nps.gov] **On Behalf Of** IMRextrev, NPS
Sent: Tuesday, November 05, 2013 10:07 AM
To: Alberts, David
Subject: Re: Houston Spaceport EA - early coordination packet

Dear Mr. Alberts,

The NPS has reviewed this project and has found no comments at this time.

Regards,

National Park Service
Intermountain Region External Review Team
Serving MT, UT, WY, CO, AZ, NM, OK, TX
imrxtrev@nps.gov

On Mon, Oct 21, 2013 at 11:33 AM, Alberts, David <David.Alberts@rsandh.com> wrote:

To Whom It May Concern,

Attached is the Houston Spaceport EA early notification packet for your review and comment.

Thank You,

Dave A

U.S. Coast Guard

U.S. Department of
Homeland Security
United States
Coast Guard



Commander
United States Coast Guard
Sector Houston-Galveston

9640 Clinton Drive
Houston, Texas 77029
Phone: (713) 671-5199
FAX: (713) 671-5147

16000
NOV 7 2013

Reynolds, Smith and Hills, Inc.
Attn: David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597

Dear Mr. Alberts,

Thank you for your letter dated 11 October 2013 regarding Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas.

We are currently finishing construction on our Sector Houston-Galveston Office buildings adjacent to Ellington Field. The Coast Guard also has an Air Station on Ellington Field. In consultation with Air Station Houston we have no objection or comment on your proposed Spaceport.

Once you further develop your environmental assessment and your plans for construction please let us know and we can comment as appropriate. We would be interested to know if this project will introduce any unique hazards to the surrounding environment, interrupt communication signals to include VHF or broadband, impose restrictions on the landing strip or pose traffic congestion in the area.

If additional information is required, please feel free to contact me as noted at the number above.

Sincerely,

A handwritten signature in blue ink, appearing to read "B. K. Penoyer".

B. K. PENOYER
Captain, U. S. Coast Guard
Commander, Sector Houston-Galveston

Harris County Public Health and Environmental Services

Harris County
HCPHES
Public Health & Environmental Services

Umair A. Shah, M.D., M.P.H.
Executive Director

Tele: 713 439-6000
Fax: 713 439-6080

November 11, 2013

Mr. David Alberts
Reynolds, Smith and Hills, Inc.
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597

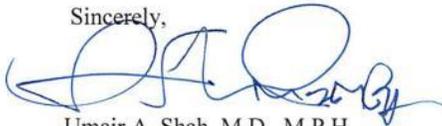
Dear Mr. Alberts:

As Executive Director of Harris County Public Health & Environmental Services (HCPHES), I am interested in efforts that recognize the importance of safeguarding the health of all residents of Harris County and appreciate the opportunity to comment on the environmental assessment (EA) for the proposed Houston Spaceport at Ellington Airport in Harris County, Texas.

HCPHES provides public health assessment, policy development and assurance activities for up to 4.09 million residents of Harris County, the third most populous county in the United States by means of an annual budget of \$60 million and over 500 employees. We appreciate you contacting our agency at the early stages of the EA, and we consider human, natural and physical characteristics of the area near Ellington Airport, as well as potential environmental, social and economic issues all very important components of the EA. The full scope of the EA, however, is unclear so we would like to request a more comprehensive description of the scope of the planned study before commenting further.

We would also like to understand better the timeline for the full study, such as any public engagement efforts including, but not limited to, public comments. We look forward to your response to this request and offering our input, as appropriate, on the proposed Houston Spaceport.

Sincerely,



Umair A. Shah, M.D., M.P.H.
Executive Director

cc: Rocaille Roberts, Director, HCPHES Office of Policy and Planning
Michael Schaffer, Director, HCPHES Environmental Public Health Division

www.hcphe.org

Texas Historical Commission

Deschappelles, Natalie

From: Alberts, David
Sent: Wednesday, November 13, 2013 3:44 PM
To: Deschappelles, Natalie
Subject: Fwd: Texas SHPO comment EA development Houston Spaceport

Please add to the agency coordination. Thanks

David E. Alberts

Southeast Region Environmental Service Group Leader
10748 Deerwood Park Blvd South
Jacksonville, FL 32256-0597
Phone: 904-256-2469 / Fax: 800-464-4358
David.Alberts@rsandh.com

Visit our website at www.rsandh.com
Connect with RS&H on [Facebook](#) [Twitter](#) [LinkedIn](#)



Please consider the environment before printing this e-mail.

Sent via mobile device.

----- Original message -----

From: Linda Henderson <Linda.Henderson@thc.state.tx.us>
Date: 11/13/2013 3:20 PM (GMT-05:00)
To: "Alberts, David" <David.Alberts@rsandh.com>
Subject: Texas SHPO comment EA development Houston Spaceport

Mr. Alberts,

I'm writing to comment on the early coordination for a proposed spaceport at Houston's Ellington Field. We received the letter on October 15, and this comment reflects coordination from our history and archeology teams. For Section 106 purposes, we would recommend using noise contours as a minimum to help establish an Area of Potential Effects for potential indirect issues. Because the area is already developed and in use as an airfield, we may have few concerns about direct effects to archeological resources or non-auditory indirect effects, but whatever your cultural resources consultants provide for Section 106 should be wrapped into your NEPA documentation.

Please let me know if you have any questions.

Texas Historical Commission Continued

Best,

Linda

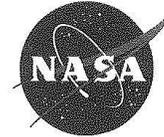
Linda Henderson
Historian, Federal Programs
History Programs Division
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711-2276
phone: 512/468-5851
www.thc.state.tx.us



NASA

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
2101 NASA Parkway
Houston, Texas 77058-3696



November 18, 2013

Reply to Attn of: JA-13-007

Mr. David E. Alberts
Southeast Region Environmental
Service Group Leader
Reynolds, Smith and Hills, Inc.
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597

Dear Mr. Alberts:

Thank you for your letter to the Johnson Space Center (JSC) requesting input on the possible environmental impacts of a proposed Spaceport to launch and retrieve reusable launch vehicles at Ellington Field (EFD). We understand that Reynolds, Smith and Hills, Inc. has been selected by the City of Houston, Houston Airport System (HAS) to write an Environmental Assessment (EA) for the project. HAS is seeking a launch site operator's license from the Federal Aviation Administration (FAA) to allow for horizontal departure and landing.

NASA operations at EFD are integral to several agency missions. NASA maintains several hangars and twenty T-38 jet training aircraft at EFD to support astronaut training. The International Space Station crew flies to the Baikonur Cosmodrome from EFD, and other NASA aircraft fly from EFD to perform atmospheric and weather research and to transport cargo items between NASA Centers. For this reason, NASA Headquarters, Environmental Management Division (EMD) informed JSC that they contacted the FAA to request "cooperating agency" status for development of the FAA EA. NASA EMD requested that representatives from JSC's Center Operations' Environmental Office serve as NASA points of contact for the EA.

JSC's Environmental Office has provided you with electronic copies of the environmental resource documents for EFD and the Sonny Carter Training Facility (SCTF), which describe the environmental conditions at those locations. Comments were also obtained from EFD and SCTF personnel. NASA EFD reported that the project, as described, should not present significant environmental impacts to NASA EFD aircraft operations and activities. SCTF reported that the only potential impacts could come from possible jet engine testing and operations for extended periods, as the SCTF is located adjacent to the southern boundary of EFD. Such operations could impact the quality of the makeup air where divers in the SCTF Neutral Buoyancy Laboratory refill NITROX SCUBA tanks for

NASA Continued

2

use. Minor levels of contaminants in the air are generally not hazardous to health but could become hazardous when the air is compressed.

If you should have any questions concerning this notification, please contact David Hickens at (281) 483-3120 or by email at david.hickens-1@nasa.gov or Charles Webster at (281) 483-2112 or by email at charles.f.webster@nasa.gov.

Thank you for notifying JSC early in the pre-project planning stage. We look forward to working with you throughout the EA process.

Sincerely,



Ellen Ochoa
Director

Texas General Land Office

Deschappelles, Natalie

From: Cummins, Colleen
Sent: Tuesday, October 15, 2013 4:48 PM
To: Deschappelles, Natalie
Subject: FW: Fwd: Federal Consistency - Ellington Airport

Colleen M. Cummins, AICP
Environmental Specialist III
4700 S. Syracuse Street, Suite 300
Denver, CO 80237
Phone: 303-409-9700 x7922 / Mobile: 704-236-0445 mailto:Colleen.Cummins@rsandh.com

Visit our website at <http://www.rsandh.com> Connect with RS&H on <https://www.facebook.com/WeAreRSandH>
<https://twitter.com/wearersandh> <http://www.linkedin.com/company/rs%26h>

-----Original Message-----

From: Federal Consistency Federal Consistency [mailto:Federal.Consistency@GLO.TEXAS.GOV]
Sent: Thursday, October 03, 2013 3:27 PM
To: Cummins, Colleen
Cc: Sheri Land
Subject: Re: Fwd: Federal Consistency - Ellington Airport

Hello Ms. Cummins,

Please pardon my delay in getting back to you. You are correct regarding the consistency determination requirements for the Ellington Airport EA. A copy of the EA will need to be submitted to us for review. The cover letter and/or the EA will need to include the following statement:

"The proposed activity complies with Texas' approved coastal management program and will be conducted in a manner consistent with such program."

You may submit it as an agent for FAA and address it to my attention.

Feel free to contact me if you need any additional assistance on this.

Ray Newby
Coastal Geologist
Coastal Resources
Texas General Land Office
1700 N. Congress
Austin, Texas 78701
phone (512) 475-3624
fax (512) 475-0680
www.glo.texas.gov

Texas General Land Office Continued

>>> Kate Zultner 9/20/2013 2:51 PM >>>

>>> <colleen.cummins@rsandh.com> 9/20/2013 11:32 AM >>>

NAME: Colleen Cummins

EMAIL: colleen.cummins@rsandh.com

PHONE: 303-409-7922

SUBJECT: Federal Consistency - Ellington Airport

SENT_FROM_FORM: www.glo.texas.gov/cf/contact-us-form/index.html

MESSAGE: Hello, I left a voice message but thought I would send an e-mail with further detail. I am working on an Environmental Assessment for the Ellington Airport and was wondering what exactly needs to be done for federal consistency. Upon reading the TX Administrative Code I think the lead federal agency (FAA, in this case) needs to send a consistency determination to the council secretary (per 506.12). Please advise if this is correct, and if so, to whom the determination should be sent. Thanks!

TO: kate.zultner

The Auto Response sent to the customer is:

Thank you for your e-mail. It has been forwarded to the proper agency staff member.

APPENDIX B

AIRSPACE AND AIRPORTS

This Page Intentionally Left Blank

B.1 Existing Airspace

Within the United States, airspace is classified as either controlled or uncontrolled. Special-use airspace and other airspace areas are additional classifications that can include both controlled and uncontrolled segments.

Controlled airspace is airspace of defined dimensions in which air traffic control service is provided to aircraft operating under both instrument flight rules (IFR) or visual flight rules (VFR). Controlled airspace is a generic term covering Class A, B, C, D, and E airspace. Class G airspace is airspace not designated Class A, B, C, D, or E airspace and is not under the jurisdiction of ATC facilities. [Table B-1](#) describes the airspace classifications. The following paragraphs describe other airspace designations not defined in [Table B-1](#):

- » Special Use Airspace and Special Assigned Airspace – This airspace is used to confine certain flight activities and to place limitations on aircraft operations that are not part of these activities. This airspace may be designated as prohibited, restricted, warning areas, alert areas, military operating areas, controlled firing areas, and national security areas.
- » Military training routes- these routes are established below 10,000 feet (ft) above mean sea level (MSL) for both IFR and VFR operations and for VFR operations at speeds in excess of 250 knots.
- » En route airways and jet routes – Commercial and private aircraft use these established IFR flight paths.

Ellington Airport (EFD) is a controlled airfield within Class D airspace, which is in effect 24 hours a day. The Class D airspace is defined as the airspace extending upward from the surface to and including 2,000 ft MSL within a 4.4-mile radius of EFD and within 1.3 miles each side of the Ellington instrument landing system (ILS) localizer north¹ course extending from the 4.4-mile radius to 4.6 miles north of EFD² and within 1.3 miles each side of the Ellington ILS localizer south³ course extending from the 4.4-mile radius to 4.7 miles south of the airport, excluding that airspace within the Houston, Texas, Class B airspace area.. Airspace outside of the Class D service area includes the controlled airspace associated with HOU and IAH. [Figure B-1](#) shows the airspace near EFD. There are four airports (excluding EFD), thirteen heliports, and one ultralight flight park within the operation ROI.

B.2 Airports and Airspace Impacts

The following sections describe the potential impacts to airspace, airports, and airport users resulting from the implementation of the No Action Alternative or Proposed Action. Analysis of the Proposed Action's impacts on airspace is not required under NEPA; pursuant to FAA Order 1050.1E, airspace is not an environmental resource category. Nevertheless, this section is included as an attachment to this EA in order to disclose the potential effect of operating reusable launch vehicles (RLVs) to and from EFD.

[Chapter 4](#) of this EA describes the Proposed Action's potential environmental impacts of RLVs operating within the operation ROI (i.e., to/from the Houston Spaceport).

¹ Ellington ILS north localizer is located at latitude 29°37'20"N. and longitude 95°09'52"W.

² The Airport is located at latitude 29°36'27"N. and longitude 95°09'32"W.

³ Ellington ILS south localizer is located at latitude 29°35'22"N. longitude 95°09'50"W.

B.2.1 No Action Alternative

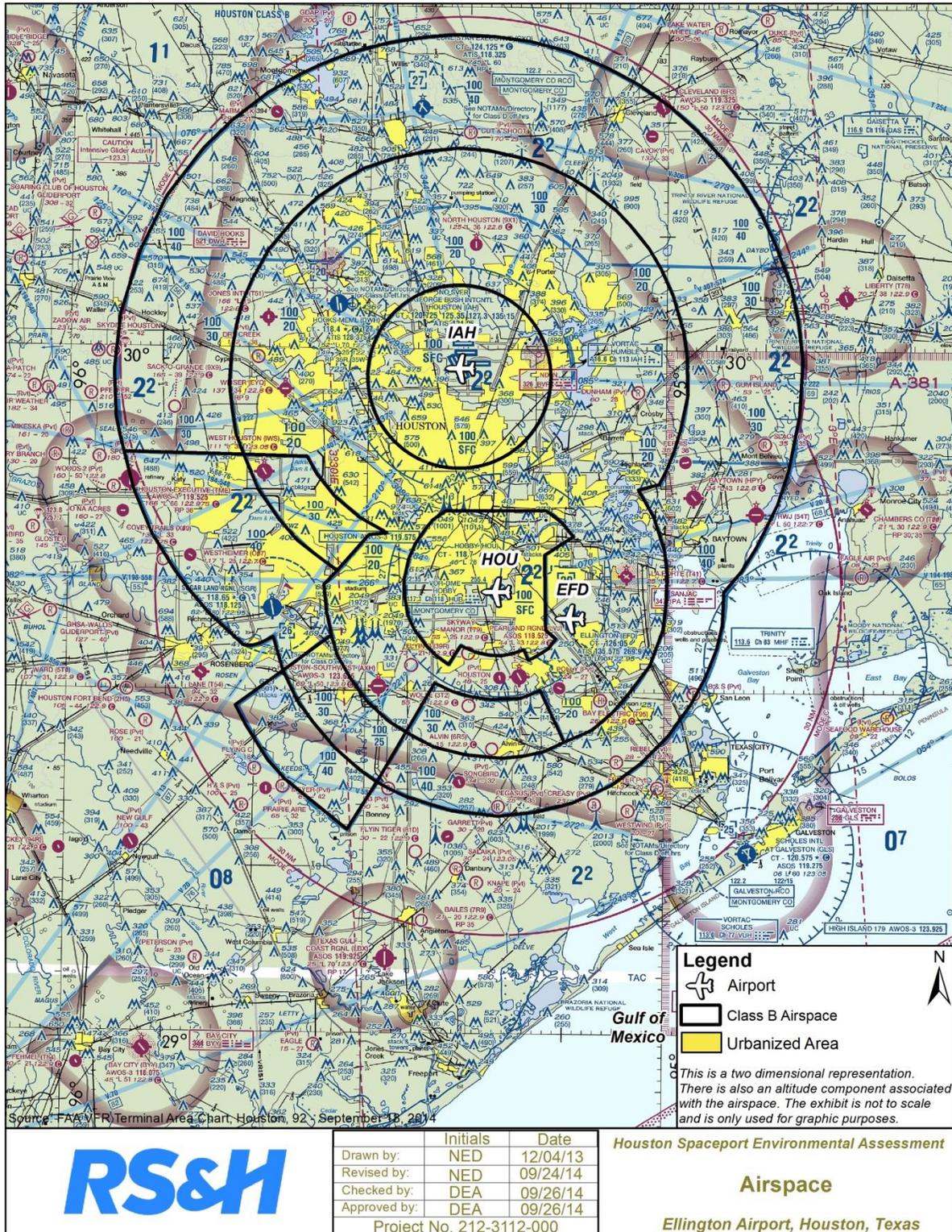
Under the No Action Alternative, the Federal Aviation Administration (FAA) would not issue the Houston Airport System (HAS) a launch site operator license at EFD. Construction of associated RLV infrastructure (e.g., hangar, taxiway, access road, etc.) would not be developed. In addition, implementation of the No Action Alternative would not result in RLV flights to or from EFD. EFD would continue to operate and serve forecasted aviation demands. Therefore, the No Action Alternative would not change the dimensions or use of the existing airspace.

**TABLE B-1
AIRSPACE CLASSIFICATIONS**

Classification	Uncontrolled/ Controlled	Description
Class A	Controlled	Within the contiguous United States and including 12 nautical miles from the coastline over the oceans, Class A airspace extends from 18,000 ft above MSL up to and including 60,000 ft. Aircraft must be equipped with a two-way radio capable of maintaining communications with air traffic control. All aircraft must receive appropriate air traffic control clearance and operate under IFR unless otherwise authorized
Class B	Controlled	Ranges from the surface to 10,000 ft above MSL surrounding the nation’s busiest airports. The dimensions are individually tailored to the specific airport, and typically consist of a surface area and two or more layers.
Class C	Controlled	Ranges from the surface to 4,000 ft above the airport elevation and surrounding those airports that have an operational control tower, that are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Usually consists of an inner surface area with a 5-nautical-mile radius, and an outer circle with a 10-nautical mile radius that extends from 1,200 ft to 4,000 ft above the airport elevation.
Class D	Controlled	Ranges from the surface to 2,500 ft above the airport elevation and surrounding those airports that have an operational control tower.
Class E	Controlled	Generally, defined as any controlled airspace that is not Class A, B, C, or D and includes airspace above Flight Level 600.
Class G	Uncontrolled	Air traffic control does not have responsibility or authority over aircraft in Class G airspace; however, most of the regulations affecting pilots and aircraft still apply.

Source: 14 CFR Part 91

**FIGURE B-1
AIRSPACE AROUND EFD**



B.2.2 Proposed Action

The Proposed Action defines a potential route the Concept X or Concept Z RLV would follow. Airspace would be cleared for departure using similar procedures that other IFR flights departing from EFD would normally use. The RLV would return to EFD using a similar flight path. Airspace would be cleared for arrival using similar procedures that other IFR flights arriving to EFD would normally use.

Airspace - The departure flight path of the RLVs would begin heading south within the Class D airspace of EFD, which starts at ground level and extends out for approximately four nautical miles from the center of EFD up to an elevation of 2,000 ft above ground level. Upon exiting EFD Class D airspace, the RLV would pass through two layers of Class B airspace. This airspace is associated with William P. Hobby Airport (HOU), located approximately 15 and 20 nautical miles from the center of HOU and at an elevation of 2,000 ft MSL to 10,000 ft MSL and 4,000 ft MSL to 10,000 ft MSL, respectively.

The RLVs would continue south for approximately 18 miles until it reached an elevation of approximately 12,000 ft. The RLV would then bank eastward approximately 16 degrees to the southeast and would continue into W-147C and/or W-147-D, as authorized by ATC. At approximately 40,000 ft, the RLV would ignite its rockets and continue to climb through Luttrell ATCAA and up to an apogee elevation of approximately 350,000 ft. The arrival path of the RLV would follow the same flight path shown in [Figure B-2](#).

Extensive coordination between HAS and representatives of the Houston Air Route Traffic Control Center, FAA Central Service Center, FAA Air Traffic Control System Command Center, FAA Airports District Office, Houston Terminal Radar Approach Control, 147th Reconnaissance Wing, and the National Aeronautics and Space Administration are ongoing to establish routes and procedures that would allow for RLVs to safely operate in and out of the Houston Spaceport at EFD without adversely affecting urban areas, existing airspace conditions, or the neighboring public-use airports. These procedures will be refined prior to RLV operations occurring at EFD.

Airport and Airport Users - EFD plays vital roles in the aviation system as military and NASA support and general aviation relief. Impacts to these operations under the Proposed Action would be minimal because the number of annual operations at EFD would be up to 50 flights per year (50 launches and 50 landings) from 2015 to 2019. Assuming spaceport operations began in 2015, the EFD 2004 Comprehensive Master Plan Update forecast indicates total operations at EFD, exclusive of RLV operations, would be 167,100 by 2016, similar to that proposed in 2019.

Thus, the maximum number of 50 flights under the Proposed Action would have a minimal impact to total operations at the Airport. However, HAS would closely coordinate scheduled RLV launches with Airport tenants and users to ensure operational efficiency.

**FIGURE B-2
PROPOSED RLV FLIGHT PATH**



Pre-Launch Impacts – Aircraft on the ground at EFD would experience minimal interruptions during RLV pre-take-off, take-off, and landing operations, as described below for each vehicle type:

- » Concept X: The Concept X RLV would roll out of its hangar and receive Jet-A fuel to top off the fuel tanks. At this point, there would be no oxidizer on board, so other aircraft operating on the ground at EFD would be required to maintain only a 50-foot distance from the RLV, similar to conventional aircraft operating practices.

When fueling is complete, the vehicle would taxi to the RP-1 fueling area (which could be as close as 25 feet away), and RP-1 fuel would be loaded. At this point, other aircraft would still be required to maintain a 50-foot distance from the RLV. The RLV would taxi north from Runway 4-22 to Taxiway G and then to Taxiway B to access the Oxidizer Loading Area (OLA). The Concept X RLV would meet the LOX tanker truck and any required portable fueling and pumping equipment at this location. This would require all other aircraft to maintain a safe distance from the RLV. The LOX truck and portable equipment would return to storage. Passengers would be loaded onto the vehicle and the vehicle would depart to the south on Runway 17R-35L. Runway 4-22 would remain open and operational during this time. In the event of inclement weather, the RLV would be de-fueled and removed from the runway, and the launch would be cancelled. Once the RLV is cleared for takeoff from the OLA, it would taxi onto Runway 17R for immediate departure. At this time, the runway is in-use and no other departure or arrival traffic would be allowed to operate at EFD.

While the LOX tanker truck is in transit to and from the RLV, it would be required to maintain a 100-foot distance from all aircraft.

- » Concept Z: The Concept Z vehicle would follow similar operational procedures as the Concept X, except this vehicle would roll out of its hangar with the HTPB solid fuel installed. The vehicle would receive Jet-A fuel in the ramp area to top off the fuel tanks. Also, instead of LOX being added, this vehicle would require N₂O.

Launch Impacts - Once the Ellington ATCT clears the RLV for takeoff, the vehicle would depart EFD's Class D airspace in the same manner as any other aircraft departing EFD on an IFR flight plan.

RLV Recovery Impacts - The RLV would return to EFD's Class D airspace under jet power or as a glider to be handed off to the Ellington ATCT like any other aircraft. An RLV returning as a glider would utilize the HI-TACAN Runway 35L arrival.⁴ Once the RLV lands, the use of Runway 17R/35L would be temporarily suspended until the RLV is removed from the runway. Non-aircraft operations such as towing equipment and other required support equipment would be permitted on all other taxiways and aprons not occupied by the RLV. Once the RLV is removed from the runway, EFD would resume normal operations.

⁴ A Categorical Exclusion was completed for this approach path and, therefore, was not included in the analysis for this EA.

The time between the RLV's initial contact with the Ellington ATCT on its return, and the termination of the RLV's flight on its designated ramp area, would depend on how quickly spaceport personnel would be able to reach the RLV with the required towing equipment. As this time would be minimal, impacts to normal operations at EFD would be insignificant.

Nearby Airports - Nominal spaceport operations would not be expected to significantly impact operations at nearby airports because the flight route would be carefully coordinated to avoid the airspace of publicly owned airports in the area. The only impacts to nearby airports expected as a result of spaceport operations would be those related to an RLV emergency landing. If an emergency landing were required, ATC would assist the RLV pilot to safely land the RLV.

[Figure B-3](#) shows three nearby airports that could accommodate a potential emergency landing. These airports would not be required to alter normal operations during an RLV launch. Normal operations would only be interrupted if the RLV pilot in command declared an emergency and required assistance.

If the pilot in command chose to land the RLV at a location other than EFD as a result of a distress situation, the RLV would be maneuvered to land at an airport of the pilot's choice and in coordination with Houston ATC. Upon landing, the RLV would likely be disabled and remain on the active runway until assistance could be rendered. After landing, all other aircraft would be required to maintain a safe distance from the RLV because the vehicle might not have expended all of its fuel.

Spaceport operations at EFD would only impact aircraft operations at nearby airports in the unlikely event of an emergency landing. Only licensed RLVs would be permitted to operate from the Houston Spaceport, reducing the likelihood that an emergency landing would be required.

FIGURE B-3
POTENTIAL EMERGENCY LANDING AIRPORTS



APPENDIX C

FINAL AIR QUALITY ASSESSMENT PROTOCOL

This Page Intentionally Left Blank

Final Air Quality Assessment Protocol

for the

Houston Spaceport Environmental Assessment

Prepared by:

KB Environmental Sciences, Inc.

and

Reynolds, Smith & Hills

Prepared for:

Houston Airport System

and the

Federal Aviation Administration

September 18, 2014

Protocol

Contents

1. Introduction	1
1.1. Purpose of the Protocol	2
1.2. Project Description	2
2. Regulatory Background	3
2.1. Regulatory Agencies	3
2.2. Regulatory Standards and Criteria for Air Quality	4
2.3. Attainment/Nonattainment Designations	5
2.4. State Implementation Plans	6
3. Existing Conditions	6
3.1. Air Quality Monitoring Data	7
4. Operational Emissions Inventory Approach and Methodology	7
4.1. Overall Approach	9
4.2. Emissions Inventory Methodology	9
4.2.1. Criteria Pollutants	12
4.2.1.1. Inventory Scope	12
4.2.1.2. Models and Methods	14
4.2.1.3. Presentation of Results	17
4.2.2. Hazardous Air Pollutants	17
4.2.2.1. Inventory Scope	18
4.2.2.2. Models and Methods	18
4.2.2.3. Presentation of Results	18
4.2.3. Greenhouse Gases	20
4.2.3.1. Inventory Scope	20
4.2.3.2. Models and Methods	21
4.2.3.3. Presentation of Results	22
5. Construction Emissions Inventory Approach and Methodology	22
5.1.1. Inventory Scope	22
5.1.2. Models and Methods	25
5.1.3. Presentation of Results	27
6. Clean Air Act Conformity	28
6.1. General Conformity	28
6.2. Transportation Conformity	30

Protocol

List of Tables

Table 1 – Agencies Involved in Air Quality Management in the Houston Area.....5
Table 2 – National Ambient Air Quality Standards6
Table 3 – Attainment Status for the Houston Area.....7
Table 4 – Ambient Air Monitoring Data (2010 – 2012)9
Table 5 – Reusable Launch Vehicle (RLV) Operational Inputs and Assumptions 12
Table 6 – EDMS Surrogate Emissions Information for Carrier Vehicles..... 18
Table 7 – RLV Fuel Truck Assignments..... 19
Table 8 – CAP Emissions Inventory Summary 20
Table 9 – HAP Emissions Inventory Summary.....22
Table 10 – GHG Emissions Inventory Summary26
Table 11 – Construction Emissions Inventory Summary.....32
Table 12 – Required Comparisons to the Federally-approved SIP34

List of Figures

Figure 1 – Spaceport EA Study Area 13
Figure 2 – Proposed Federal Action Construction Elements24

1. Introduction

Serving as the Project Sponsor, the Houston Airport System (HAS) is proposing a range of improvements (i.e., the “Proposed Action”) at Ellington Airport (EFD) located in Houston, Texas. The Proposed Action consists of FAA approval for airport development and issuance of licenses and permits needed to operate horizontally-launched and horizontally-landing commercial spacecraft at the proposed Houston Spaceport at EFD.

The HAS is preparing an Environmental Assessment (EA) for this action in accordance with the National Environmental Policy Act (NEPA). The EA will evaluate a range of potential environmental impacts, including impacts related to ambient air quality and climate change, attributable to the construction and operation of the Houston Spaceport.

The air quality assessment will be conducted following Federal Aviation Administration (FAA) guidelines including Order 1050.1E Change 1, *Environmental Impacts: Policies and Procedures* (Appendix A, Section 2, *Air Quality*); Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*; and the *Air Quality Procedures for Civilian Airports and Air Force Bases*. The majority of the technical analysis will be accomplished using the FAA *Final Programmatic Environmental Impact Statement (F-PEIS) for Horizontal Launch and Reentry of Reentry Vehicles*, the latest version of the FAA *Emissions and Dispersion Modeling System* (EDMS Version 5.1.4.1), and other U.S. Environmental Protection Agency (EPA) approved methods and models.

The focus of the air quality assessment will be on the EPA criteria air pollutants, which are carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), coarse particulate matter less than or equal to 10 microns (PM₁₀), fine particulate matter less than or equal to 2.5 microns (PM_{2.5}), and lead (Pb). Ozone-forming (O₃) emissions will also be addressed through the analysis of the precursors of volatile organic compounds (VOCs) and nitrogen oxides (NO_x). Hazardous (or “toxic”) air pollutants (HAPs) will similarly be evaluated. The assessment will take the form of an emissions inventory – both with and without the Proposed Action. Greenhouse gases (GHG) emissions attributable to the Proposed Action will also be addressed.

Dispersion modeling of criteria air pollutants and National Ambient Air Quality Standards (NAAQS) will not be conducted. At the time when this project was initiated, the *Air Quality Procedures for Civilian Airports and Air Force Bases* states that atmospheric dispersion modeling is not considered for actions at airports with fewer than 2.6 million annual passengers and/or 180,000 General Aviation (GA)/Air Taxi Operations. Per the FAA Terminal Area Forecast (TAF), EFD is forecast to have 0.001534 million annual passengers in both 2015 and 2020. Similarly, the level of GA/Air Taxi

Operations during these years is forecast to be 96,635. Both of these values are beneath the atmospheric dispersion modeling threshold provided in FAA guidance. Therefore dispersion modeling is not considered.

The results of the criteria air pollutants emissions inventory will be compared to appropriate federal Clean Air Act (CAA) General Conformity Rule applicability thresholds. The overall goal is to help ensure that the Proposed Action would be constructed and operated in compliance with NEPA, the State Implementation Plan (SIP) and other applicable federal, state and local air quality regulations.

1.1. Purpose of the Protocol

This document, referred to as the *Air Quality Assessment Protocol*, outlines and describes the overall technical approach and methodology for conducting the air quality analysis for the Houston Spaceport EA. The primary objective for producing this protocol is to advise air quality regulatory agencies of the analysis and methodology and receive their concurrence. This will help ensure that work is completed in an acceptable manner and the Proposed Action will comply with applicable federal, state, and local air quality regulations.

The information provided in this document should be treated as a synopsis of the technical approach of the air quality assessment in which results of the analysis will be described in the Draft EA, Final EA, and any accompanying Air Quality Technical Appendices.

1.2. Project Description

The scope of the Proposed Action includes the following landside and airside development features, all of which will be addressed in the air quality assessment of the Proposed Action and are discussed in greater detail within Protocol **Sections 4 and 5**:

- Hangar/Processing Facility and Apron Construction: The Proposed Action includes the landside development of an initial hangar/processing facility and apron area. The dimensions of the hangar/processing facility are 200' x 230'. Adjacent to the hangar/processing facility would be a 220' x 500' apron area. The location of the initial hangar/processing facility is southeast of Runway 4-22.
- Propellant and Oxidizer Storage and Fueling: Oxidizers and propellants needed to support horizontally-operating commercial spacecraft would be stored adjacent to the existing fuel storage facility and/or stored offsite and delivered via tanker truck. No new fuel farms or onsite storage tanks would be required to support the

Proposed Action, although the Proposed Action does include installation of a fuel truck parking area in the southwest corner of the airport and a temporary oxidizer storage area south of Runway 4-22. Four 75' x 75' concrete pads are proposed in order for the safe temporary storage of the oxidizer. As many as ten Hybrid Rocket Motor casings containing solid propellants, weighing up to 3,000 lbs. each, could be stored in the hangar/processing facility described above.

- Oxidizer Loading Area Construction: The Oxidizer Loading Area (OLA) is a 150' x 150' concrete pad to be located along Taxiway B in between Runway 17R-35L and Runway 17L-35R.
- Airside Modifications and Connected Actions: Other activities necessary to support the Proposed Action include: (1) the construction of a 1,000' taxiway from the proposed apron area to the existing airfield system; (2) pavement repair to Taxiway D; (3) construction of a 220' access roadway to the Oxidizer Storage Tank Pad; construction of a 200' x 70' vehicle parking area; (4) construction of a 1,270' access road and (5) installation of fencing and stormwater treatment areas.

2. Regulatory Background

2.1. Regulatory Agencies

On the national level, the EPA establishes clean air goals and sets unified air quality standards under the federal CAA. Throughout Texas and within the Houston area, the achievement of these goals and enforcement of these standards is delegated primarily to the Texas Council on Environmental Quality (TCEQ) and the Houston-Galveston Area Council (H-GAC).

The HAS is responsible for the overall management of air quality at the three airports under its jurisdiction, comprising EFD, George Bush Intercontinental Airport (IAH), and William P. Hobby International Airport (HOU). However, as the lead Federal Agency for the Houston Spaceport EA, the FAA is primarily responsible for assessing the air quality impacts for the Proposed Action in accordance with NEPA and the General Conformity Rule of the CAA. As the region's Metropolitan Planning Organization (MPO), the H-GAC takes the lead role in the region's highway planning, transit planning, and demonstration of Transportation Conformity with respect to the CAA. The Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT) may support the H-GAC in the assessment of air quality impacts associated with surface transportation facilities throughout Houston, including the Transportation Conformity Rule of the CAA.

Table 1 provides a summary listing of these federal, state and local agencies’ roles and responsibilities as they potentially apply to the Houston Spaceport EA air quality assessment.

Table 1 – Agencies Involved in Air Quality Management in the Houston Area

Agency	Roles and Responsibilities
U.S. Environmental Protection Agency (EPA)	<i>Federal agency</i> – Sets national clean air policies under the federal CAA; promulgates the NAAQS; reviews and approves SIPs. Also regulates aircraft emissions. Texas is part of EPA’s Region 6, headquartered in Dallas, Texas.
Federal Aviation Administration (FAA)	<i>Federal agency</i> – Responsible for reviewing and approving the Houston Spaceport EA under NEPA and ensuring compliance with the General Conformity Rule of the CAA. The FAA Southwest Regional Offices are located in Fort Worth, Texas.
Federal Highway Administration (FHWA)	<i>Federal agency</i> – Responsible for the approval of roadway projects under NEPA and the Transportation Conformity Rule of the CAA. This includes working with TxDOT and H-GAC in establishing the transportation plans for the Houston area.
Texas Council on Environmental Quality (TCEQ)	<i>State agency</i> – Implements and enforces air quality programs state-wide including those pertaining to ambient air monitoring, stationary source permitting, smoke management, regional haze, and major source permitting. Also involved in the development of the SIPs in non-attainment areas in Texas. Headquartered in Austin, Texas.
Texas Department of Transportation (TxDOT)	<i>State agency</i> – Works with the FHWA and H-GAC to coordinate the Houston regional components of the transportation plans. Headquartered in Austin, Texas.
Houston-Galveston Area Council (H-GAC)	<i>Local agency</i> – The H-GAC assists the TCEQ in the SIP preparation process with regards to development of local control strategies for on-road and non-road mobile sources. Takes the lead role in the region’s highway planning, transit planning, and demonstration of Transportation Conformity with respect to the CAA. Headquartered in Houston, Texas.
Houston Airport System (HAS)	<i>Local agency</i> - Responsible for the overall management of air quality at Ellington Airport, George Bush Intercontinental Airport, and William P. Hobby International Airport.

CAA = Clean Air Act; NAAQS = National Ambient Air Quality Standards; NEPA = National Environmental Policy Act; SIP = State Implementation Plan
 Source: KB Environmental Sciences, 2013.

2.2. Regulatory Standards and Criteria for Air Quality

In order to protect the public health and environmental welfare from the deleterious effects of air pollution, the EPA has established NAAQS for the following six criteria air pollutants: CO, Pb, NO₂, O₃, PM₁₀, PM_{2.5}, and SO₂. The current NAAQS are summarized on **Table 2**.

Table 2 – National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS
CO	8-hour ¹	9 ppm
	1-hour ¹	35 ppm
NO ₂	1-hour ²	100 ppb
	Annual ³	53 ppb
O ₃	8-hour ⁴	0.075 ppm
Pb	Rolling 3-month ⁵	0.15 µg/m ³
PM _{2.5}	Annual ⁶	12 µg/m ³
	24-hour ²	35 µg/m ³
PM ₁₀	24-hour ⁷	150 µg/m ³
SO ₂	1-hour ⁸	75 ppb
	3-hour ¹	0.5 ppm

ppb = parts per billion ppm = parts per million, µg/m³ = micrograms per cubic meter.

¹Not to be exceeded more than once per year

²98th Percentile, averaged over 3 years

³Annual mean

⁴Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years

⁵Not to be exceeded

⁶Annual mean, averaged over 3 years.

⁷Not to be exceeded more than once per year on average over 3 years

⁸99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

Source: U.S. Environmental Protection Agency
 (<http://www.epa.gov/air/criteria.html>), 2013.

2.3. Attainment/Nonattainment Designations

Geographic areas found to be in violation of one or more NAAQS are classified as nonattainment areas. Nonattainment designations are sometimes severity based (e.g., serious, severe, moderate, marginal) which dictates the deadline (i.e., the attainment year) by which the area must be brought back into attainment of a NAAQS. States with nonattainment areas must develop a SIP demonstrating how the area will be brought back into attainment of the NAAQS within designated timeframes. Areas where concentrations of the criteria pollutants are below (i.e., within) the NAAQS are classified as attainment areas. Lastly, areas with prior nonattainment status that have since transitioned to attainment are known as maintenance areas.

The current attainment/nonattainment designations for the area surrounding EFD (i.e., Harris County) are listed on **Table 3**. As shown, the area is presently in marginal nonattainment of the EPA’s 2008 NAAQS for O₃. The area is also still considered severe nonattainment for the 1997 O₃ NAAQS. EPA proposed to revoke the 1997 NAAQS in June 2013 (78 FR 34178) but until this action is published as a final rule in the Federal Register, both the severe and marginal designations apply in Harris County.

In addition, the area is technically designated nonattainment of the now historical 1-hour O₃ standard. After revoking the 1-hour O₃ standard, EPA ruled that most areas, including Harris County, were no longer subject to the 1-hour standard as of 2005. Nonetheless, per the anti-backsliding provisions of the CAA, the area may still be subject to certain federal requirements for nonattainment and maintenance areas.¹

Table 3 – Attainment Status for the Houston Area

Pollutant	Designation
Carbon monoxide (CO)	Attainment
Lead (Pb)	Attainment
Nitrogen dioxide (NO ₂)	Attainment
Ozone (O ₃), 1-Hour	Severe-17
Ozone (O ₃), 8-Hour (1997)	Severe-15
Ozone (O ₃), 8-Hour (2008)	Marginal
Particulate Matter (coarse or PM ₁₀)	Attainment
Particulate Matter (fine or PM _{2.5})	Attainment
Sulfur dioxide (SO ₂)	Attainment

Source: US Environmental Protection Agency Green Book Nonattainment Areas (<http://www.epa.gov/airquality/greenbk/>), 2013.

2.4. State Implementation Plans

The current federally-approved O₃ SIP for the Houston area is the *Houston-Galveston-Brazoria Eight-Hour (HGB) Ozone Nonattainment Area Reasonable Further Progress State Implementation Plan Revision (Rule Log 2006-030-SIP-NR)*, adopted by TCEQ on May 23, 2007 and approved by EPA in April of 2009 (74 FR 18298).

Since then, the TCEQ has prepared and adopted the *HGB Reasonable Further Progress State Implementation Plan for the 1997 Eight-Hour Ozone Standard (Rule Log 2009-018-SIP-NR)* and the *HGB Attainment Demonstration SIP Revision for the 1997 Eight-Hour Ozone Standard (Rule Log No. 2009-017-SIP-NR)*. EPA has recently proposed to approve these SIP revisions (78 FR 55029, 78 FR 55037) and once this approval is finalized these will become the applicable SIPs for the Proposed Action at EFD.

3. Existing Conditions

Ambient (i.e., outdoor) air monitoring data closest to EFD is disclosed in this section with the aim of comparing pollutant concentrations in the vicinity of the airport with the NAAQS. As indicated in **Section 1.2 (Project Description)**, existing airport operations at EFD, including those of aircraft, ground support equipment (GSE), motor

¹ Codified under 40 CFR 51.905, the anti-backsliding provisions of the CAA prevent the rescission of measures or requirements applicable to areas in which a NAAQS is revoked or relaxed by the EPA, such that select requirements continue to apply to an area after revocation or relaxation of the NAAQS in question (i.e., the 1-hour O₃ NAAQS), if the requirements were applied in the area based on the area's prior designation.

vehicles and stationary sources, will not change as a result of the Proposed Federal Action. Accordingly, a baseline emissions inventory of existing operations will not be prepared in support of the Houston Spaceport EA.

3.1. Air Quality Monitoring Data

As required by the EPA, the TCEQ has established and maintains a permanent network of air quality monitoring stations throughout the state. These monitors record concentrations of pollutants in the ambient (i.e., outdoor) air to gauge compliance with the NAAQS. Air quality monitoring data collected at the station closest to the Airport for the period of 2010 to 2012 are shown on **Table 4**. For ease of reference, the applicable NAAQS for each monitored pollutant is included. The monitoring station is located 5 miles to the northeast of the Airport. As shown, violations of the 8-hour O₃ NAAQS were registered at the monitoring station during this timeframe, consistent with the area's current designation of nonattainment with respect to the 8-hour O₃ NAAQS.

4. Operational Emissions Inventory Approach and Methodology

For the Houston Spaceport EA, criteria air pollutant (CAP), hazardous air pollutant (HAP), and GHG emissions associated with the proposed Spaceport's operation will be assessed and pursuant to the NEPA and according to FAA Order 5050.4B 706 f(3).² The Proposed Federal Action's compliance with the General Conformity Regulations of the CAA (40 CFR Part 93) will also be assessed, the details of which are discussed in **Section 6**.

² Federal Aviation Administration. *FAA Order 5050.4b- National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. Effective Date April 28, 2006.

Table 4 – Ambient Air Monitoring Data (2010 – 2012)

Site Name and Address (Dir. from EFD)	Pollutant	Averaging Period	NAAQS	Year				Exceeds NAAQS
				2010	2011	2012	Average ⁹	
Houston Deer Park #2 4514 1/2 Durant St. (5 miles NE)	CO	8-hour ¹	9 ppm	0.9	1.0	0.9	NA	No
		1-hour ¹	35 ppm	1.7	1.5	1.2	NA	No
	NO ₂	1-hour ²	100 ppb	41.5	40.3	36.8	39.5	No
		Annual ³	53 ppb	17.3	15.7	16.6	NA	No
	O ₃	8-hour ⁴	0.075 ppm	0.085	0.083	0.085	0.084	Yes
	Pb	Rolling 3-month ⁵	0.15 µg/m ³	ND	0.02	<0.01	NA	No
	PM _{2.5}	Annual ⁶	12 µg/m ³	ND	8.5	10.1	9.3	No
		24-hour ²	35 µg/m ³	ND	21.3	22.1	21.7	No
	PM ₁₀	24-hour ⁷	150 µg/m ³	35	41	47	41	No
	SO ₂	1-hour ⁸	75 ppb	1.4	26.6	22.7	15.6	No
3-hour ¹		0.5 ppm	0.001	0.017	0.015	NA	No	

ND = no measurement available, NA = not applicable, ppb = parts per billion ppm = parts per million, µg/m³ = micrograms per cubic meter.

¹Not to be exceeded more than once per year

²98th Percentile, averaged over 3 years

³Annual mean

⁴Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years

⁵Not to be exceeded

⁶Annual mean, averaged over 3 years.

⁷Not to be exceeded more than once per year on average over 3 years

⁸99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

⁹Three-year average only reported if applicable to NAAQS evaluation.

Source: U.S. Environmental Protection Agency AIRData – Monitor Data Queries 2013; and U.S. Environmental Protection Agency Air Quality System – Detailed AQS Data, 2013.

The approach for the Houston Spaceport air quality assessment is consistent with FAA Order 1050.1e, Appendix A, Section 2.1.³ The air quality assessment methodology is formulated in accordance with the following regulations and guidance and is detailed in the following sections:

- *FAA Air Quality Procedures for Civilian Airports and Air Force Bases* ⁴;
- *FAA Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources* ⁵;
- *FAA Order 1050.1E, Change 1, Guidance Memo #3* ⁶; and
- *FAA Final Programmatic Environmental Impact Statement (F-PEIS) for Horizontal Launch and Reentry of Reentry Vehicles.*⁷

4.1. Overall Approach

The overall air quality approach will reflect the Proposed Action described in **Section 1.2** and will utilize the methodology outlined in the 2005 F-PEIS. Specific assessment components include⁸:

- Operation of “Concept X and Concept Z” Reusable Launch Vehicles (RLV) for commercial space flights (and carrier aircraft in the case of Concept Z); and
- Operation of fuel tanker trucks necessary to supply fuel to the RLVs.

4.2. Emissions Inventory Methodology

In general terms, an emissions inventory is a quantification of the amount, or weight, of pollutants emitted from a source (or combination of sources) over a period of time. The outcome is a product of source activity levels (e.g., RLV operations) combined with appropriate emission factors (e.g., grams of pollutant/operation). The results are segregated by pollutant type (e.g., CO, NO_x, VOC, etc.), emission source (e.g., construction equipment, RLV, facility support equipment, etc.) and project milestone year. The data are commonly reported in units of tons per year.

³ Federal Aviation Administration. *FAA Order 1050.1E Change 1- Environmental Impacts: Policies and Procedures*. Effective Date March 20, 2006. NOTE: Order 1050.1F was published on August 14, 2013 but is still undergoing public comment, and as of November 2013 has not been published as a final notice in the Federal Register.

⁴ Federal Aviation Administration Office of Environment and Energy. *Air Quality Procedures for Civilian Airports and Air Force Bases (with Addendum)*. September, 2004.

⁵ Federal Aviation Administration Office of Environment and Energy. *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources version 1*. September, 2009.

⁶ Federal Aviation Administration. *FAA Order 1050.1E, Change 1, Guidance Memo #3: Considering Greenhouse Gases and Climate under the National Environmental Policy Act (NEPA): Interim Guidance*. Prepared by Thomas Cuddy for Julie Marks. January 12, 2012.

⁷ Federal Aviation Administration Office of Commercial Space Transportation. *Final Programmatic Environmental Impact Statement for Horizontal Launch and Reentry of Reentry Vehicles*. December, 2005.

⁸ Motor vehicle traffic associated with worker commutes and RLV passenger trips may also occur but are expected to be of nominal contribution to air quality impacts associated with the Proposed Federal Action.

Table 5 identifies anticipated RLV operations by concept vehicle type, along with emissions that will be considered and atmospheric layer. CAP, HAP and GHG emissions from Jet A combustion will be considered up to the local mixing height for the Houston area, which is 3,038 feet based on the nearest upper air meteorological data station reported to EPA's Support Center for Regional Atmospheric Modeling (SCRAM). The local mixing height is defined as the vertical extent in the troposphere above which emitted pollutants do not mix downward to ground level. According to launch parameters described in the F-PEIS for the concept vehicles, oxidizer and propellant combustion do not occur until the RLVs exit the lower troposphere, which extends above the local mixing height.

Additionally, GHG emissions from propellant and oxidizer combustion during take-off, launch and landing will be quantified up to the stratospheric level. Ozone Depleting Substance (ODS) emissions to the stratosphere from Concept X and Z vehicles will not be addressed because, according to the F-PEIS, neither of these RLV types emit hydrogen chloride (HCl) or chlorine ions (Cl-) that would lead to significant impacts related to ozone depletion.

Each concept RLV conducts a powered take-off with the capability to propel the concept RLV into sub-orbit. The Concept Z RLV consists of the carrier vehicle (e.g., White Knight Two) as well as its RLV (e.g., SpaceShip Two). The Concept X RLV is estimated to conduct 50 takeoffs and 50 landings per year, combusts Jet A during takeoff, combusts RP-1 propellant and liquid oxygen (LOX) oxidizer during rocket engine launch procedures (ignited once the vehicle reaches altitude of its operating area), and relies on jet engine power to assist during landing. The Concept Z RLV is similarly estimated to conduct 50 takeoffs and 50 landings per year, combusts Jet A during takeoff, combusts Hydroxyl-terminated Polybutadiene (HTPB) propellant and nitrous oxide (N₂O) oxidizer during rocket engine launch of the RLV at altitude (e.g., Spaceship Two), and the RLV carrier vehicle combusts Jet A upon landing.

Based on the description of the concept vehicles to be used at the Houston Spaceport, and consistent with the 2005 F-PEIS, emissions to the mesosphere would be negligible to non-existent. Powered engine operations would not occur in the ionosphere, so assessment of electron-depleting substances in the F layer of the ionosphere are discounted from the analysis.

Table 5 – Reusable Launch Vehicle (RLV) Operational Inputs and Assumptions

Concept Type	Annual Launches/Landings	Powered Landing?	Utilized Fuels (by Atmospheric Layer)					Emissions Considered (by Atmospheric Layer)				
			LTr	FTr	St	Me	Io	LTr	FTr	St	Me	Io
<u>Concept X</u>	50/50	Yes	Jet A				CAP, GHG, HAP	GHG	GHG			
				LOX and RP-1								
<u>Concept Z</u>	50/50	Yes/No ¹	Jet A				CAP, GHG, HAP	GHG	GHG			
					N ₂ O and HTPB							

CAP = Criteria Air Pollutants; FTr = Free Troposphere (3,038 to approximately 32,000 feet); GHG = Greenhouse Gases; H₂O₂ = Hydrogen Peroxide; HAP = Hazardous Air Pollutants; HTPB = Hydroxyl-terminated polybutadiene; Io = Ionosphere (264,001 feet and above); LOX = Liquid Oxygen; LTr = Lower Troposphere (up to 3,038 feet); Me = Mesosphere (163,501 to approximately 264,000 feet); N₂O = Nitrous Oxide; ODS = Ozone Depleting Substances; RLV = Reusable Launch Vehicle; St = Stratosphere (32,001 to approximately 163,500 feet)

¹ The carrier vehicle would return under jet engine power while the RLV would glide on its return to EFD

Source(s): Federal Aviation Administration Office of Commercial Space Transportation. *Final Programmatic Environmental Impact Statement for Horizontal Launch and Reentry of Reentry Vehicles*. December, 2005;
RS&H. *Ellington Airport Spaceport Feasibility Study*. February 10, 2012.

Specific methodologies by which CAP, HAP and GHG emissions from the RLVs, as well as other emissions sources (i.e., fuel trucks, engine testing), are identified and discussed in the forthcoming sections. As previously stated, normal operations from aircraft, GSE, motor vehicles and other sources at EFD will not be quantified in an emissions inventory as these sources are not expected to change significantly due to the implementation of the Proposed Action.

4.2.1. Criteria Pollutants

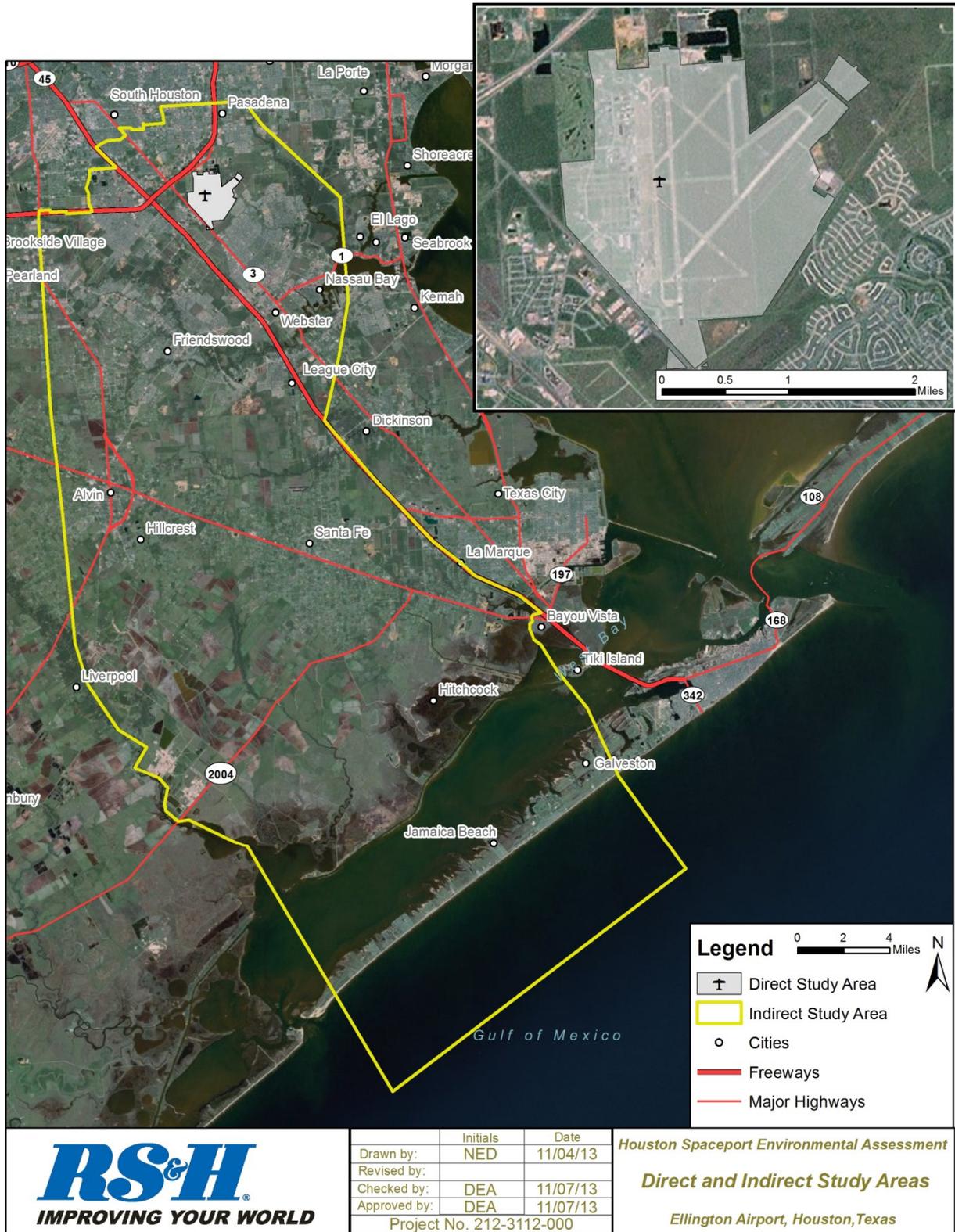
Operational emissions of CO, SO_x, PM₁₀, and PM_{2.5}, as well as O₃ precursor emissions of NO_x and VOC, will be addressed according to the following scope and methods.

4.2.1.1. Inventory Scope

For the air quality protocol, direct and indirect study areas for the Houston Spaceport EA is shown on **Figure 1**. A “direct study area” was established for environmental considerations dealing with more specific, direct impact issues such as wetlands, floodplains, and biotic communities. The direct study area encompasses approximately four square miles and includes the Airport property. The direct study area represents the areas where direct disturbance of area features could potentially occur. For environmental considerations dealing with broad, indirect impact issues, an “indirect study area” is used to describe features and assess impact potential. The indirect study area is based on a large geographic area to assess impacts that may occur in the surrounding communities, such as impacts to air quality. The indirect study area encompasses approximately 600 square miles and includes portions of Harris, Brazoria, and Galveston counties. For CAP emissions, only the component of airspace below the local mixing height in the Houston Area (3,038 feet) will be considered. As shown on **Table 5**, 100 take-offs/launches/landings of both the Concept X and Concept Z vehicles will be analyzed in years 2015 and 2020.

As noted in **Section 4.1**, fuel tanker truck emissions and engine testing emissions will also be considered in the CAP emission inventories.

Figure 1 – Spaceport EA Study Area



4.2.1.2. Models and Methods

RLV Operations

The FAA Emissions and Dispersion Modeling System (EDMS version 5.1.4.1) will be used to quantify CAP and HAP emissions from RLV Jet A combustion up to the local mixing height. EDMS provides an emissions estimate for all modes within a Landing/Take-off (LTO) Cycle, including taxi-out, take-off, climb-out, approach, landing, and taxi-in. Based on known operational characteristics for the Concept RLVs, emissions from these operational modes will be considered in the inventory of Concept X and Z vehicles. **Table 6** summarizes EDMS aircraft surrogate assignments to be used in the CAP emissions inventory.

Both Concept X and Z craft would taxi under engine power from the hangar to the Oxidizer Loading Area, for a distance of approximately 12,900 feet. After the oxidizer is loaded, the vehicles would again taxi to the north end of Runway 17R-35L for a southern departure, a distance of approximately 6,750 feet.

After the Concept vehicles return to EFD, there are two scenarios to get back to the hangar:

1. The Concept X vehicle would taxi under jet power a distance of 13,800 feet to the hangar.
2. The Concept Z carrier vehicle (White Knight Two) would taxi the 13,800 feet to the hangar. The RLV portion (Space Ship Two) would be tugged/towed by an aircraft tractor from the north end of Runway 17L-35R back to the hangar.

To convert these travel paths to taxi times, a taxi speed of 17.6 miles per hour will be applied for engine taxi operations, consistent with information applied within EDMS, whereas a speed of 7.1 miles per hour will be applied to estimate the component conducted by the aircraft tractor as if moves the Concept Z RLV back to the hangar⁹. Based on the information provided herein, the Concept X will be assigned an EDMS taxi time of 12.7 minutes on departure and 8.9 minutes on arrival. The Concept Z will be similarly assigned a departure taxi time in EDMS of 12.7 minutes, but will instead be assigned an aircraft tractor that operates 22.1 minutes per arrival.

⁹ Manufacturer specifications for a Tug Technologies Model GT50 aircraft tow tractor were consulted to compute this travelling speed, which represents the arithmetic average speed associated with its six forward-power throttle settings.

Table 6 – EDMS Emissions Information for Carrier Vehicles

RLV Type	Engine Type (No. of Engines)	Bypass Ratio	Rated Thrust (kN)	Mode	Emissions Index (g/kg fuel)				
					CO	HC	NO _x	SO _x	PM (SN)
<u>Concept X</u>	BR700-710C4-11 Annular (2)	4.05	68.77	Idle (Taxi)	31.57	2.29	4.5	1.29	0.45
				Takeoff	1.04	0.02	19.52	1.29	14.30
				Climb Out	0.92	0.02	15.43	1.29	12.36
				Approach	4.92	0.05	7.71	1.29	0.35
<u>Concept Z</u>	PW308A Annular (4)	4.1	30.71	Idle (Taxi)	38.21	6.62	3.65	1.29	1.7
				Takeoff	0.83	0.00	16.74	1.29	15.00
				Climb Out	1.06	0.00	14.06	1.29	15.00
				Approach	4.08	0.02	8.03	1.29	2.50

CO = Carbon Monoxide; HC = Hydrocarbon; kN = kilonewtons; NO_x = Oxides of Nitrogen; PM = Particulate Matter; RLV = Reusable Launch Vehicle; SN = Smoke Number; SO_x = Oxides of Sulfur

Source: Emissions and Dispersion Modeling System (EDMS) version 5.1.4.1

RLV Fueling

EDMS will be used to estimate emissions from the operation of fueling tanker trucks. The Concept X and Z vehicles would utilize a 175 horsepower diesel fuel tanker truck for Jet A refueling activities, which according to EDMS default information could operate up to 20 minutes per departure. Additional tanker trucks would be required to transport and deliver LOX and N₂O oxidizers and RP-1 fuel. In the case of LOX, a higher capacity fuel truck than that normally assigned by EDMS would be required. **Table 7** outlines the fuel tanker truck assignments for each RLV concept type evaluated under the Proposed Action.

Table 7 – RLV Fuel Truck Assignments

RLV Type	Number of Trucks Required	Truck Type	Fuel (HP)	Contents	Operating Time per Operation (minutes)
<u>Concept X</u>	3	F750 DART 3,000 to 6,000 gallon	Diesel (175)	Jet A	20
		F750 DART 8,000 to 10,000 gallon	Diesel (300)	LOX	20
		F750 DART 3,000 to 6,000 gallon	Diesel (175)	RP-1	20
<u>Concept Z</u>	2	F750 DART 3,000 to 6,000 gallon	Diesel (175)	Jet A	20
				N ₂ O	20

HP = horsepower
 Source(s): Emissions and Dispersion Modeling System (EDMS) version 5.1.4.1;
 RS&H. *Ellington Airport Spaceport Feasibility Study*. February 10, 2012.

Engine Testing

Routine jet engine testing is expected to occur at EFD under the Proposed Action to help ensure the safety of RLV operations. For the air quality analysis, it is estimated that 15 tests for each concept RLV type will be conducted per year.

For jet engine testing, EDMS will be used to estimate testing emissions for engines specified on **Table 6**. It is assumed that engines will be tested for seven minutes per default power setting in EDMS (power settings in EDMS represent seven, 30, 85 and 100 percent of full thrust).

4.2.1.3. Presentation of Results

Table 8 provides a summary template for the CAP emissions inventory. Emissions of each CAP, in short tons, will be presented per analysis year (e.g., 2015) and source (e.g., support equipment). As discussed in **Section 6**, estimated emissions of NO_x and VOC will be included in a General Conformity Applicability Analysis whereby the total annual emissions of these pollutants will be compared against the applicable *de minimis* thresholds (i.e., 25 tons per year for NO_x and VOC) for a severe O₃ nonattainment area.

Table 8 – CAP Emissions Inventory Summary

Source	2015 Emissions (tons)					
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOC
Concept X RLVs						
Concept Z RLVs						
Support Equipment						
Total						
<i>De minimis</i> Threshold	--	25	--	--	--	25
Source	2020 Emissions (tons)					
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOC
Concept X RLVs						
Concept Z RLVs						
Support Equipment						
Total						
<i>De minimis</i> Threshold	--	25	--	--	--	25

Source: KB Environmental Sciences, Inc.

4.2.2. Hazardous Air Pollutants

HAPs are pollutants that do not have established NAAQS but present potential human health risks from short (i.e., acute) or long-term (i.e., chronic) exposures. FAA’s current policy is to compute emissions inventories of HAPs for NEPA disclosure purposes only.¹⁰ Toxicity ranking, dispersion analysis, or risk assessments are too speculative to be appropriate for incorporating into an EA. Therefore, the emissions-inventory approach described herein is only designed to disclose the types and amounts of HAPs associated with the Proposed Action.

In September of 2009, FAA released its guidance for quantifying airport-related HAP emissions from airport sources.¹¹ The guidance provides detailed recommendations on

¹⁰ Federal Aviation Administration Office of Environment and Energy, *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources*, September 2, 2009.

¹¹ Federal Aviation Administration Office of Environment and Energy, *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources*, September 2, 2009.

the preparation of the analysis and references HAPs speciation profiles for airport emission sources.¹²

4.2.2.1. Inventory Scope

Calendar year 2015 and 2020 (first year of the proposed license and +5 years for NEPA analysis) HAP emissions from lower tropospheric RLV operations and fuel truck utilization will be computed and disclosed.

4.2.2.2. Models and Methods

EDMS emissions of VOC computed for the purposes of the Proposed Action CAP emissions inventory (see **Section 4.2.1.2**) will be speciated into individual organic gas (OG) emissions for the HAP analysis. Based on FAA's guidance for quantifying airport-related HAPs, only those OG compounds identified in the CAA as HAPs or included in the EPA's Integrated Risk Information System (IRIS) database should be reported in NEPA documentation.¹³ The current version of EDMS provides estimates of 45 OG species that meet these criteria.

Aloft, a major constituent of unburned HTPB is 1,3-butadiene, although high combustion temperatures during rocket engine operations would likely cause much of the combustion-related 1,3-butadiene emissions to decompose. High combustion temperatures associated with rocket engine operations may also cause polycyclic aromatic hydrocarbon (PAH) formation as the fuel is combusted. The F-PEIS identifies the Cl⁻ and precursor HCl as HAP emissions of concern from select concept vehicle types, but as stated in **Section 4.2**, the RLV concepts to be operated at the Houston Spaceport do not emit these compounds during rocket operations.

Because HAP emissions from RP-1 and HTPB combustion in the upper troposphere and stratosphere would not mix to ground level, these emissions will be discounted from the air quality assessment.

4.2.2.3. Presentation of Results

Table 9 provides a summary template for the HAP emissions inventory. Emissions of each HAP, in pounds, will be presented per analysis year (e.g., 2015) and emission source (e.g., RLV Jet Engines).

¹² A speciation profile is the amount of an individual HAP per the amount of VOC or PM emitted by that emission source.

¹³ Federal Aviation Administration Office of Environment and Energy. *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources version 1*. September, 2009.

Table 9 – HAP Emissions Inventory Summary

HAP	2015 HAP Emissions (pounds)		
	RLV Jet Engines	Support Equipment	Total
1,3-butadiene		--	
2-methylnaphthalene		--	
Acetaldehyde			
Acetone		--	
Acrolein		--	
Benzaldehyde			
Benzene		--	
Ethylbenzene		--	
Formaldehyde			
Isopropylbenzene (cumene)		--	
M & P-xylene		--	
Methyl alcohol		--	
Naphthalene		--	
N-heptane		--	
O-xylene		--	
Phenol (carbolic acid)		--	
Propionaldehyde			
Styrene		--	
Toluene		--	
HAP	2019 HAP Emissions (pounds)		
	RLV Jet Engines	Support Equipment	Total
1,3-butadiene		--	
2-methylnaphthalene		--	
Acetaldehyde			
Acetone		--	
Acrolein		--	
Benzaldehyde			
Benzene		--	
Ethylbenzene		--	
Formaldehyde			
Isopropylbenzene (cumene)		--	
M & P-xylene		--	
Methyl alcohol		--	
Naphthalene		--	
N-heptane		--	
O-xylene		--	
Phenol (carbolic acid)		--	
Propionaldehyde			

Styrene	--
Toluene	--

Source: KB Environmental Sciences, Inc.

Note: Gray banding in the table signifies that the HAP is not emitted from the subject emissions source.

4.2.3. Greenhouse Gases

The effect of GHG on climate change is presently a dynamic and emerging topic and will be addressed as part of the air quality assessment. GHG emissions of carbon dioxide (CO₂), methane (CH₄) and N₂O associated with the Proposed Action will be quantified and disclosed per emission source, analysis year, and atmospheric layer. The results will be expressed in terms of carbon dioxide equivalent (CO₂e) emissions using Global Warming Potentials (GWP) identified by the Intergovernmental Panel on Climate Change (IPCC).¹⁴ GWPs normalize emissions of individual GHG to the atmospheric warming potential of CO₂ and correspond to 21 for CH₄ and 310 for N₂O

Emissions of water vapor (H₂O) will also be quantified and disclosed, however, no IPCC-sanctioned GWP has been issued for H₂O and accordingly these emissions will not be quantified as CO₂e.

To the extent necessary, a GHG emissions inventory will be conducted following commonly used and widely accepted guidelines:

- ACRP Report 11, *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*; and
- *IPCC Guidelines for National Greenhouse Gas Inventories*.

4.2.3.1. Inventory Scope

All emissions sources included in the CAP emissions inventory will also be considered for GHG evaluation; to the extent those sources are documented to emit tropospheric GHG. These sources specifically comprise RLVs, fuel trucks, and engine testing. Calendar year 2015 and 2020 activity inputs will remain consistent with the CAP inventory for these sources. GHG emissions from RLV operations in the upper troposphere and stratosphere will also be inventoried in accordance with the F-PEIS.

¹⁴ Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2007: Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. 2007.

4.2.3.2. Models and Methods

Lower Tropospheric Emissions

For GHG emissions in the lower troposphere, EDMS will be used to quantify Jet A fuel consumption (as weight) from the RLV operations and jet engine tests beneath the atmospheric mixing height, as well as diesel fuel consumption from the GSE.

Fuel weight estimates will be factored against fuel densities of 6.84 pounds per gallon for Jet A and 7.1 pounds per gallon for diesel to estimate a volume of fuel. GHG emissions rates, in pounds of GHG per gallon of fuel, will then be applied to the estimated fuel usages to compute individual GHG emissions. These rates are summarized as follows:

- 21.095 pounds CO₂ per gallon of Jet A;¹⁵
- 0.0006 pounds CH₄ per gallon of Jet A;¹⁶
- 0.00046 pounds N₂O per gallon of Jet A;¹⁷
- 22.384 pounds CO₂ per gallon of diesel;¹⁷
- 0.00053 pounds CH₄ per gallon of diesel;¹⁶
- 0.00019 pounds N₂O per gallon of diesel¹⁶

Individual GHG emissions will be normalized to CO₂e using GWPs identified in **Section 4.2.3.**

Free Tropospheric and Stratospheric Emissions

EDMS information will be consulted to conservatively estimate Jet A fuel consumption from RLV operations above the mixing height, assuming one hour to climb to the release altitude with the engines operating at climb out power setting, and one hour for the return flight with the aircraft engines operating at approach power setting.

GHG emissions from Concept X RLVs as they combust LOX and RP-1 during launch and landing will be computed according to methods outlined in the F-PEIS. Specifically, it is assumed that the Concept X RLV will operate similarly to the LV-2 Concept identified in the F-PEIS in that it consumes approximately 3,204 kilograms of LOX/RP-1 in the tropospheric phase of launch/landing and 6,546 kilograms during the stratospheric phase. Emissions weight fractions for CO₂ and H₂O from the F-PEIS, equaling 0.931 and 0.25, respectively, will be applied to the total fuel consumption to estimate GHG emissions.

¹⁵ Energy Information Administration (EIA). *Voluntary Reporting of Greenhouse Gases Program, Fuel and Energy Source Codes and Emission Coefficients*. <http://www.eia.doe.gov/oiaf/1605/coefficients.html>. 2008.

¹⁶ U.S. Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2005*. April 2007.

Assessment of SpaceShip Two launch emissions from an environmental assessment prepared for the Mojave Air and Space Port indicated that “[e]ach launch would use an estimated 13,000 pounds of N₂O and 2,500 pounds of solid organic fuel [i.e., HTPB] for a total propellant mass of 15,500 pounds.¹⁷ The document also cites emissions indices for these activities (in mass pollutant per unit mass of fuel) of 0.240 for CO₂ and 0.100 for H₂O. These fuel consumption estimates and emissions indices will be similarly applied to Concept Z RLV activities occurring at Houston Spaceport.

4.2.3.3. Presentation of Results

Table 10 provides a summary template for the GHG emissions inventory. Emissions of applicable GHG, in metric tons, will be presented per analysis year (e.g., 2015), source (e.g., RLV) and atmospheric layer (e.g., stratosphere).

5. Construction Emissions Inventory Approach and Methodology

The construction requirements for the Proposed Action will involve a variety of air emissions sources including on- and off-road construction vehicles, machinery and equipment. These emission sources are associated with the following activities:

- Site preparation and earth-moving;
- Material transport;
- Leveling and grading of project footprint;
- Facilities construction operations; and
- Storage and movement of raw and construction materials.

Impacts from construction activities planned for the Proposed Action will be restricted to an evaluation of CAP emissions occurring during the construction period (i.e., 2015). The scope and methodology of the construction emissions inventory is outlined in the following sections.

5.1.1. Inventory Scope

Construction activities included in the Proposed Action include the improvements shown on **Figure 2**, comprising the addition of an RLV hangar and apron space, construction of connecting taxiways and access roadways, fuel storage tank pads and loading areas, and fuel truck parking facilities.

¹⁷ Federal Aviation Administration. *Final Environmental Assessment for the Launch and Reentry of SpaceShip Two Reusable Suborbital Rockets at the Mojave Air and Space Port*. 2012.

Table 10 – GHG Emissions Inventory Summary

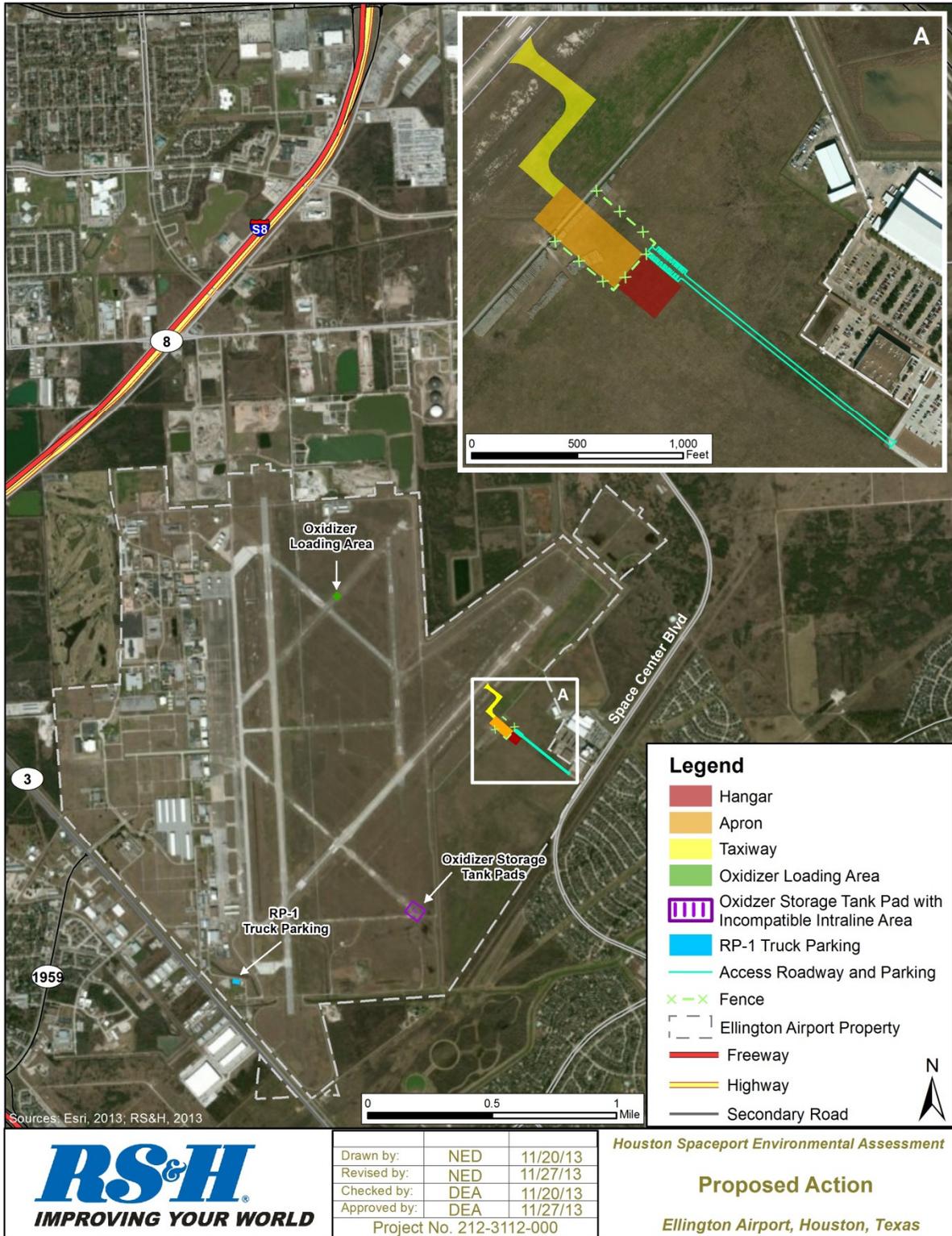
Atmospheric Layer	Source	2015 Emissions (metric tons)				
		CO ₂	CH ₄	N ₂ O	CO ₂ e	H ₂ O
Lower Troposphere	Concept X RLVs					--
	Concept Z RLVs					--
	Support Equipment					--
	Engine Testing					--
<i>Subtotal – Lower Troposphere</i>						
Free Troposphere	Concept X RLVs		--	--		
	Concept Z RLVs		--	--		
<i>Subtotal – Free Troposphere</i>						
Stratosphere	Concept X RLVs		--	--		
	Concept Z RLVs		--	--		
<i>Subtotal – Stratosphere</i>						
Grand Total						
Atmospheric Layer	Source	2019 Emissions (metric tons)				
		CO ₂	CH ₄	N ₂ O	CO ₂ e	H ₂ O
Lower Troposphere	Concept X RLVs					--
	Concept Z RLVs					--
	Support Equipment					--
	Engine Testing					--
<i>Subtotal – Lower Troposphere</i>						
Free Troposphere	Concept X RLVs		--	--		
	Concept Z RLVs		--	--		
<i>Subtotal – Free Troposphere</i>						
Stratosphere	Concept X RLVs		--	--		
	Concept Z RLVs		--	--		
<i>Subtotal – Stratosphere</i>						
Grand Total						

Source: KB Environmental Sciences, Inc.

Note: Gray banding in the table signifies that the GHG is not emitted from the subject emissions source, except in the instance of water vapor for some sources. Some sources do actually emit water vapor, but it is not quantified in the lower troposphere for this assessment

Construction is expected to commence and be completed in 2015, representing a construction period of one full year. Emissions from construction activities noted on **Figure 2** will be estimated based on a projected construction activity schedule, including the number of vehicles/pieces of equipment, the types of equipment/type of fuel used, vehicle/equipment utilization rates, and the year(s) construction occurs. For this assessment, emissions of CO, VOC, NO_x, SO_x, and PM₁₀/PM_{2.5} will be evaluated.

Figure 2 – Proposed Federal Action Construction Elements



With respect to HAPs, according to FAA's *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources*:

“Construction activities at airports generally represent a temporary source of air emissions associated with the site preparation, construction and/or demolition. Depending on the project requirements, the work can involve an assortment of both on-road vehicles (i.e., pick-up trucks, dump trucks, etc.) and non-road (i.e., scrapers, dozers, loaders, etc.) equipment. The exhaust from these vehicles and equipment contains OGs (including HAPs).

While it is recognized that construction equipment and some construction activities (e.g., equipment fueling) result in emissions of HAPs, it is not currently possible to accurately speciate the OG/HAP emissions of construction activities due to lack of data.”

Accordingly, quantification of construction-related HAP emissions has been discounted from this assessment.

To date, FAA has issued guidance on the quantification of GHG from aircraft operations for NEPA purposes.¹⁸ On the other hand, they have not issued guidance or a policy statement on the calculation and disclosure of construction-related GHG. So, construction GHG are excluded from the Houston Spaceport air quality analysis.

5.1.2. Models and Methods

On-road Construction Vehicles

To estimate emissions associated with on-road construction vehicles including haul trucks, vehicles utilized for the purposes of security, escorting and project management, and personal employee vehicles, annual vehicle miles of travel (AVMT) will be calculated according to **Equation 1** using the following assumptions:

Equation 1

$$\text{Emission Rate (tons/year)} = \text{Emission Factor (grams/mile)} * \text{miles per day} * \text{days/year} * \\ (453.59/2000 \text{ tons/gram})$$

¹⁸ Federal Aviation Administration. *FAA Order 1050.1E, Change 1, Guidance Memo #3: Considering Greenhouse Gases and Climate under the National Environmental Policy Act (NEPA): Interim Guidance*. Prepared by Thomas Cuddy for Julie Marks. January 12, 2012.

- Haul trucks, materials delivery vehicles and other site vehicles specified in the anticipated construction schedule for the Proposed Action will travel 30 miles per each round trip (representing the average driving distance to the nearest fill borrow site).
- Employee AVMT will be calculated assuming 30 miles per work day (which is the approximate round trip distance between EFD and the Houston city center) and applied to the manpower estimates per construction phase noted in the anticipated construction schedule.

Emission factors for each on-road construction vehicle will be developed using the EPA Motor Vehicle Emissions Simulator (MOVES Version 2010b), with inputs specific to the HGB O₃ nonattainment area developed for use in the statewide Trend Emissions Inventories computed by the TCEQ.¹⁹ The Trend Inventories supply input data to MOVES for the HGB area in terms of vehicle mix, vehicle age, inspection/maintenance programs, fuel formulations and other parameters. For this assessment, an average speed of 35 miles per hour, representing the average of posted vehicle speeds in the area, will be adopted for all on-road vehicles included in the analysis.

Nonroad Construction Equipment

Construction-related emissions associated with the exhaust from heavy nonroad equipment (i.e., backhoes, bulldozers, graders, etc.) will be estimated according to **Equation 2**, using information from the anticipated construction schedule regarding: the number and types of construction equipment to be used on the project (including fuel type and horsepower rating); the deployment schedule of equipment (monthly and annually); and the approximate daily operating time.

Equation 2

$$\text{Emission Rate (tons/year)} = \text{Emission Factor (grams/horsepower-hour)} * \text{size (horsepower)} * \text{hours per day} * \text{days per year} * \text{Load Factor} * (453.59/2000 \text{ tons/gram})$$

Emissions factors, in grams of pollutant per horsepower hour of operation, will be obtained from the Texas NonRoad Model (TexN version 1.6) for construction equipment operating in the HGB nonattainment area. TexN will be invoked such that all standing emissions control programs identified in the area SIP, including the use of Texas Low

¹⁹ Texas Commission on Environmental Quality (TCEQ). *On-road, Mobile Source Trend Emissions Inventories for All 254 Counties in Texas for 1999- 2030*. Prepared by then Texas Transportation Institute. July, 2011.

Emissions Diesel (TxLED), are in effect. Equipment load factor, representing the percentage of full throttle at which given equipment typically operates, will also be extracted from TexN for use in **Equation 2**.

Fugitive Emissions

Fugitive dust emissions from debris loading and other construction activities will be included in the impact estimate. PM emissions associated with debris loading will be computed consistent with the methodology outlined by the Midwest Research Institute (MRI) assuming 0.046 ton of debris would be generated per square foot of material to be demolished.

To estimate emissions from other site-wide construction activities, a fugitive dust emission factor of 1.2 tons per acre disturbed per month of construction will be used, assuming that 25 percent of the construction project area will be disturbed per construction month identified on the anticipated schedule.²⁰ PM_{2.5} will be assumed to comprise ten percent of the PM₁₀ emissions.²¹ Erosion control measures and dust suppression programs are typically formulated to minimize these fugitive particulate emissions, consistent with the Texas Administrative Code (TAC) at 30 TAC §111.143, §111.145 and §111.147. A dust control efficiency of 75 percent will be applied to represent adherence to these measures.²²

Evaporative VOC emissions associated with the application of hot mix asphalt on areas requiring paving (e.g., roadways, parking lots, and taxiways) will be estimated using raw materials quantities, as well as an emission factor of 0.053 ton of VOC per acre of asphalt material laid, following methodology outlined by the National Association of Clean Air Agencies (NACAA).²³

5.1.3. Presentation of Results

Table 11 provides a summary template for the construction period emissions inventory. Emissions of each CAP, in short tons, will be presented per source (e.g., nonroad equipment). As discussed in **Section 6**, estimated emissions of NO_x and VOC will be used for a General Conformity Applicability Analysis whereby the total annual emissions of

²⁰ U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emissions Factors (AP-42). Fifth Edition, Volume I Chapter 13: Miscellaneous Sources*. 1995.

²¹ Pace, Thompson G. *Examination of the Multiplier Used to Estimate PM_{2.5} Fugitive Dust Emissions From PM₁₀*. Presented at the Environmental Protection Agency 14th International Emission Inventory Conference. Las Vegas, NV, 2005.

²² U.S. Environmental Protection Agency. *Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures*. OAQPS, EPA-450/2-92-004. 1992.

²³ U.S. Environmental Protection Agency, Emission Inventory Improvement Program, Asphalt Paving, Chapter 17, Volume III, April 2001, http://www.epa.gov/ttn/chiep/eiip/techreport/volume03/iii17_apr2001.pdf.

these pollutants will be compared against the applicable *de minimis* thresholds (25 tons per year for NO_x and VOC) for a severe O₃ nonattainment area.

Table 11 – Construction Emissions Inventory Summary

Source	2015 Emissions (tons)					
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOC
Nonroad Construction Equipment						
Onroad Construction Vehicles						
Employee Vehicles						
Asphalt Paving	--	--	--	--	--	
Fugitive Dust	--	--	--			--
Total						
<i>De minimis</i> Threshold	--	25	--	--	--	25

Source: KB Environmental Sciences, Inc.

6. Clean Air Act Conformity

Considerations for the Proposed Action related to the CAA General and Transportation Conformity regulations, codified at 40 CFR Parts 51 and 93, are discussed within this section.

6.1. General Conformity

Because the Proposed Action occurs in an area currently designated nonattainment for O₃, a General Conformity Applicability Test outlined at 40 CFR §93.153(b) will be prepared, whereby the CAP operational emissions inventories of the Proposed Federal Action in both 2015 and 2020 will be compared to applicable *de minimis* thresholds established for a severe O₃ nonattainment area (i.e., 25 tons per year of NO_x and VOC). Construction period emissions in 2015 will also be included in the General Conformity Applicability Test.

Exceeding the *de minimis* thresholds for NO_x and VOC is unlikely based on the scope of the Proposed Action. However, if *de minimis* thresholds are exceeded for any given year, a formal General Conformity Determination will be prepared in consultation with EPA Region 6 and the TCEQ.

The current federally-approved SIP for the purposes of determining General Conformity of the Proposed Action is the *Houston-Galveston-Brazoria Eight-Hour Ozone Nonattainment Area Reasonable Further Progress State Implementation Plan Revision*

(*Rule Log 2006-030-SIP-NR*), adopted by TCEQ on May 23, 2007 and approved by EPA in April of 2009.²⁴

When comparing to the SIP, analysis year requirements for General Conformity Determinations promulgated at 40 CFR §93.159(d) comprise the following conditions:

- The applicable attainment year for the nonattainment area;
- The year of peak emissions associated with the Proposed Action; and
- Any year for which the applicable federally-approved SIP contains an emissions budget.

Based on EPA's approved reclassification of the Houston area to severe nonattainment status, the HGB nonattainment area must demonstrate compliance with the 1997 Ozone NAAQS no later than June 15, 2019.²⁵ Accordingly, the TCEQ has adopted year 2018 as the attainment year for SIP purposes as it is the last year in the SIP timeframe that contains a complete ozone season.²⁶

As stated in **Section 4.2.1.1**, operational emissions associated with the Proposed Action will be computed for 2015 (i.e., initial year of operations) and 2020 (i.e. initial year plus five) for the purposes of the EA, years that do not directly coincide with the applicable attainment year for the 1997 8-hour O₃ NAAQS. To make the necessary comparisons at 40 CFR §93.159(d), Proposed Action emissions will be interpolated using the computed 2015 and 2020 emissions inventories.

Additionally, Proposed Action inventory years for both project construction and project operations fall after the last emissions budget year in the federally-approved SIP (i.e., year 2008). In accordance with 40 CFR §93.162(a), the Proposed Action emissions will be compared to the last emission budget year in the SIP; in this case, the 2008 emissions budget for the HGB nonattainment area. Because the federally-approved SIP also contains an emissions budget for base year 2002, this budget will also be included for comparative purposes.

In summary, the following comparisons on **Table 12** would be made to the SIP in the event that a formal General Conformity Determination is required for the Proposed Action.

²⁴ Approval and Promulgation of Air Quality Implementation Plans; Texas; Reasonable Further Progress Plan, Motor Vehicle Emissions Budgets, and 2002 Base Year Emissions Inventory; Houston-Galveston-Brazoria 1997 8-Hour Ozone Nonattainment Area. 74 FR 18298. April 22, 2009.

²⁵ Clean Air Act Reclassification of the Houston/Galveston/Brazoria Ozone Nonattainment Area; Texas; Final Rule. 73 FR 56983. October 1, 2008.

²⁶ Houston-Galveston-Brazoria Attainment Demonstration State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard. Project No. 2009-017-SIP-NR. Adopted March 10, 2010.

Table 12 – Required Comparisons to the Federally-approved SIP

Requirement¹	Approved SIP Year(s)²	Proposed Action Year(s)	Federal Analysis	Resulting Comparison(s)
Attainment Year (2018)	2008 ³	2018 (Operations) ⁵		2018 Proposed Action to 2008 SIP Year
Peak Year ⁴	--	2020 (Operations)		2020 Proposed Action to 2008 SIP Year
Any Other SIP Emissions Budget Year	2002, 2008	2015 (Operations and Construction) 2020 (Operations)		2015 Proposed Action to 2002 and 2008 SIP Years; 2020 Proposed Action to 2002 SIP Year

¹ 40 CFR §93.159(d)

² Houston Galveston-Brazoria Eight-Hour Ozone Nonattainment Area Reasonable Further Progress SIP revisions [2006-030-SIP-NR] adopted May 23, 2007 and approved at 74 FR 18298 on April 22, 2009.

³ An attainment year inventory is not included in the federally-approved SIP. Per 40 CFR §93.162(a), a comparison to 2008 (i.e., the latest available SIP budget year) will be made in its place.

⁴ Peak year refers to Proposed Action only.

⁵ Operational emissions would be interpolated for interim years of interest for the purposes of determining General Conformity.

6.2. Transportation Conformity

The Transportation Conformity Rule requires that roadway projects deemed “regionally significant” (i.e., arterials, freeways, etc.) be included in a conforming Transportation Improvement Plan (TIP) or equivalent document. In the project-level context, Transportation Conformity applies only to projects funded or approved under U.S.C. Title 23 or the Federal Transit Laws (49 U.S.C. Chapter 53). Houston Spaceport will have no FHWA or FTA funding; therefore, transportation conformity does not apply to the project.

This Page Intentionally Left Blank

APPENDIX D

SECTION 106 COORDINATION

This Page Intentionally Left Blank

TEXAS HISTORICAL COMMISSION
real places telling real stories

6 June 2014

Daniel Czelusniak
 Commercial Space Transportation, AST-100
 Federal Aviation Administration
 800 Independence Avenue, SW
 Washington, DC 20591

Re: *Project review under Section 106 of the National Historic Preservation Act of 1966*
Proposed Houston Spaceport, Ellington Airport, Houston, Harris County, Texas (FAA)

Dear Mr. Czelusniak,

Thank you for sending us information on the above-referenced project, a proposed spaceport facility that would be licensed by the Federal Aviation Administration (FAA). This letter serves as official comment from Texas' State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC). This is a more formal response following up on our email message to you on April 18 that we **concurred** with the Federal Aviation Administration's determination of "No Historic Properties Affected" by this project.

THC staff led by Linda Henderson and Brad Jones reviewed the materials and concurred with the findings. For future spaceport coordination, we would like to work with FAA ahead of time to outline appropriate project Area of Potential Effect and survey methodology, especially for projects at existing airport facilities. Because many of Texas' airfields have ties to World War II and the Cold War, in addition to seeing evaluations on NRHP eligibility on resources outside airport boundaries, we also will need information on resources within the confines of the airport boundary, evaluated within the context of aviation but also military history.

Thank you again for coordinating with our office and for helping identify and protect the state's historic resources. For questions about our role in the review process or our comments on this project in particular, please contact us: linda.henderson@thc.state.tx.us or 512/463-5851.

Sincerely,

Linda Henderson, Historian

For:

Mark Wolfe, State Historic Preservation Officer



RICK PERRY, GOVERNOR • MATTHEW F. KREISLE, III, CHAIRMAN • MARK WOLFE, EXECUTIVE DIRECTOR
 P.O. BOX 12276 • AUSTIN, TEXAS • 78711-2276 • P 512.463.6100 • F 512.475.4872 • www.thc.state.tx.us



U.S. Department
of Transportation
**Federal Aviation
Administration**

MAR 18 2014

Office of Commercial Space Transportation

800 Independence Ave., SW.
Washington, DC 20591

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
108 W. 16th Street
Austin, TX 78701

**SUBJECT: Section 106 Consultation for the Proposed Houston Spaceport at Ellington Airport,
Harris County, Texas**

Dear Mr. Wolfe:

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA) is preparing an Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's (HAS's) proposal to operate a commercial space launch site at the Ellington Airport (EFD) in Harris County, Texas (see Attachment 1) and offer the site to commercial space launch vehicle operators for the operation of horizontal take-off and horizontal landing reusable launch vehicles (RLVs). To operate a commercial space launch site, HAS must obtain a launch site operator license from the FAA. Under the Proposed Action addressed in the EA, the FAA would: (1) issue a launch site operator license to HAS for the operation of a commercial space launch site at EFD, (2) issue launch licenses to prospective launch vehicle operators that would allow them to conduct launches of horizontal take-off and horizontal landing RLVs from EFD, and (3) provide unconditional approval to modify the existing Airport Layout Plan to reflect the designation of a launch site boundary and existing and future spaceport facilities and infrastructure.

The action of issuing a launch site operator license and launch licenses, and the unconditional approval to modify an existing Airport Layout Plan, is considered a federal undertaking under the regulations of the Advisory Council for Historic Preservation (36 Code of Federal Regulations [CFR] §800.16(y)) for Section 106 of the National Historic Preservation Act. This letter initiates consultation with your office regarding the proposed undertaking. A description of project activities, the project Area of Potential Effects (APE), identification of historic properties, and assessment of effect are outlined below.

Project Activities

HAS proposes that two types of horizontal RLVs would operate at EFD: the Concept X vehicle and/or the Concept Z vehicle. Under current designs, the Concept X vehicle's size and weight are comparable to a mid-sized business jet with twin turbofan engines. It would take off and land under conventional jet engine power. At high altitude (over 50,000 feet), the vehicle would ignite rocket engines to reach suborbital altitudes. The Concept Z vehicle is a two-part vehicle, including a carrier vehicle and an attached RLV. The carrier vehicle would take off under jet engine power and climb to approximately

50,000 feet, at which point the RLV would separate from the carrier vehicle and use its rocket engine to reach suborbital altitudes. The carrier vehicle would make a powered landing like a conventional aircraft. The Concept Z vehicle would make an unpowered, glide landing. Both RLVs would use common propellants (fuel and oxidizer) for propulsion, such as conventional Jet-A fuel, liquid oxygen, and refined kerosene. Attachment 2 shows examples and descriptions of the proposed RLV concept vehicles.

HAS proposes up to 50 flights per year at the Houston Spaceport. Initially, RLV flights would begin in 2015 and gradually increase up to 50 flights per year during the timeframe of the launch site operator license (expected to be 2014–2019). No launches would be conducted at night (between the hours of 10:00 pm to 6:59 am). The proposed RLV flight path would depart EFD to the south and rocket ignition would occur in the Offshore Warning Areas located over the Gulf of Mexico (see Attachment 3). Following a successful suborbital flight, the RLV would then return to EFD either under jet power (Concept X) or in glided flight (Concept Z).

The project also involves constructing spaceport facilities and infrastructure to support operations. The proposed facilities and infrastructure include a hangar, hangar access road and parking area, apron, fencing around the apron, taxiway, propellant truck parking area, and a concrete pad for loading oxidizer. No new fuel farms and/or onsite storage tanks for propellants would be required. Propellants not already stored at EFD would be stored offsite and delivered to EFD by tanker truck. All facilities and infrastructure would be constructed within the existing EFD boundary (see Attachment 4).

Area of Potential Effects

In accordance with 36 CFR §800.4(a)(1), an APE needs to be established for the proposed undertaking in consultation with your office. The FAA has determined an APE in consideration of both potential direct and indirect effects to archaeological and architectural resources as a result of implementing the proposed undertaking. The proposed APE is defined as the area encompassed by the existing Day-Night Average Sound Level (or DNL) 65 A-weighted decibel (or dBA) aviation noise contour (see Attachment 5). The proposed APE would encompass all potential direct and indirect effects on archaeological and architectural resources. Although this proposed APE does not account for the additional noise that would be generated from up to 50 annual RLV launches, based on the existing number of annual flights at EFD (approximately 144,702) and the fact that the RLVs would use jet engines during takeoff and landing (the Concept Z vehicle would conduct an unpowered, glide landing), it is unlikely the existing DNL 65 dBA aviation noise contour would change notably.

The RLVs would generate sonic booms over the Gulf of Mexico during RLV ascent and reentry. During ascent, the sonic boom would be propagated upwards and would not impact the Earth's surface and therefore, would not be heard. A second sonic boom would be generated during RLV reentry, at around 80,000 feet over the Gulf of Mexico. This sonic boom would impact the water surface of the Gulf of Mexico and would not be heard on land. Therefore, sonic booms were not considered when defining the APE because they would have no potential for effect on historic properties.

For archaeological resources, potential effects would be limited to the area within the APE where ground disturbance would occur from construction of the hangar, hangar access road and parking area, apron, fencing around the apron, taxiway, and propellant truck parking area. The oxidizer loading area is currently a paved area. For architectural resources, potential effects would extend to the boundary of the APE. The FAA requests your concurrence on the determination of the APE.

Identification of Historic Properties

A review of the Texas Historic Sites Atlas and the National Register of Historic Places (NRHP) online database revealed no historic properties within the APE. The closest historic property is the Historical Marker for the Webster Presbyterian Church (see Attachment 5).

Assessment of Effect

There are no known NRHP-listed or eligible historic properties within the APE. Therefore, under the proposed undertaking, there would be no direct effects from ground disturbing activities associated with the proposed undertaking.

Increase in noise at the airport would be minimal, and there are no architectural resources eligible for the NRHP that would be adversely affected by changes to the setting due to noise from the proposed RLV operations under the proposed undertaking. The FAA requests your concurrence with the finding of no historic properties affected.

Please provide any comments you have regarding the proposed APE and finding of effect within 30 days. If you have any questions or need further information on the project, please contact Mr. Daniel Czelusniak, of my staff, at 202-267-5924 or at Daniel.Czelusniak@faa.gov. Thank you in advance for your input on this project.

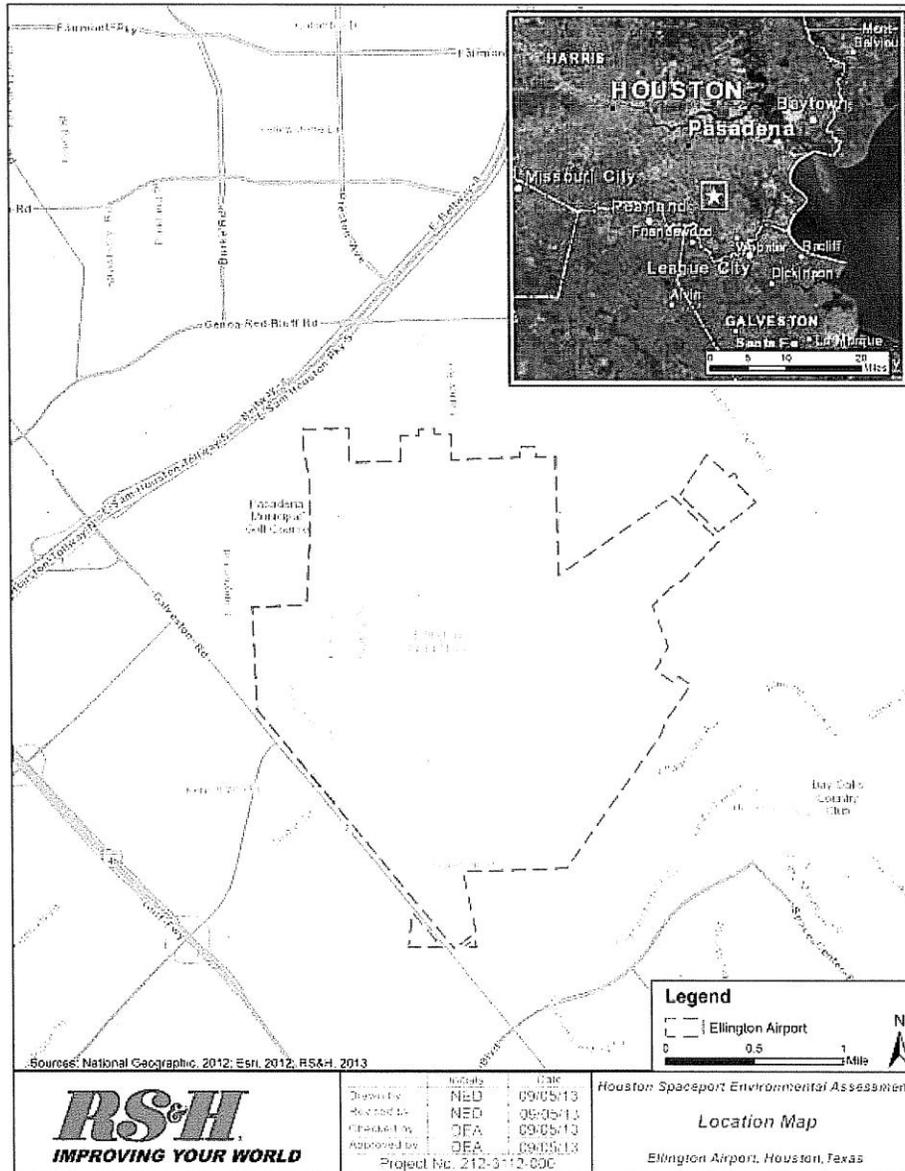
Sincerely,



Daniel Murray
Manager, Space Transportation Development Division

- Attachments:
1. Location of Ellington Airport
 2. Examples of Concept X and Concept Z Launch Vehicles
 3. Proposed Launch Vehicle Flight Path
 4. Proposed Spaceport Facilities and Infrastructure
 5. Area of Potential Effects

Attachment 1. Location of Ellington Airport



Attachment 2. Examples of Concept X and Concept Z Launch Vehicles

Concept X Vehicle Examples

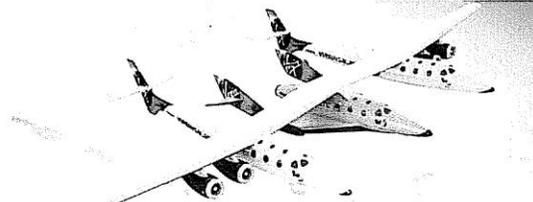


Source: Rocketplane Global, 2011



Source: Rocketplane Global, 2011

Concept Z Vehicle Example



Source: Virgin Galactic, 2011

Reusable Launch Vehicle	Takeoff Power Source	Power Source to Reach Sub-orbital Altitude ¹	Power Source to Land at Spaceport
Concept X	Aircraft engine	Rocket engine	Aircraft engine/glide
Concept Z	Aircraft engine ²	Rocket engine	Glide, no power ³

Notes:

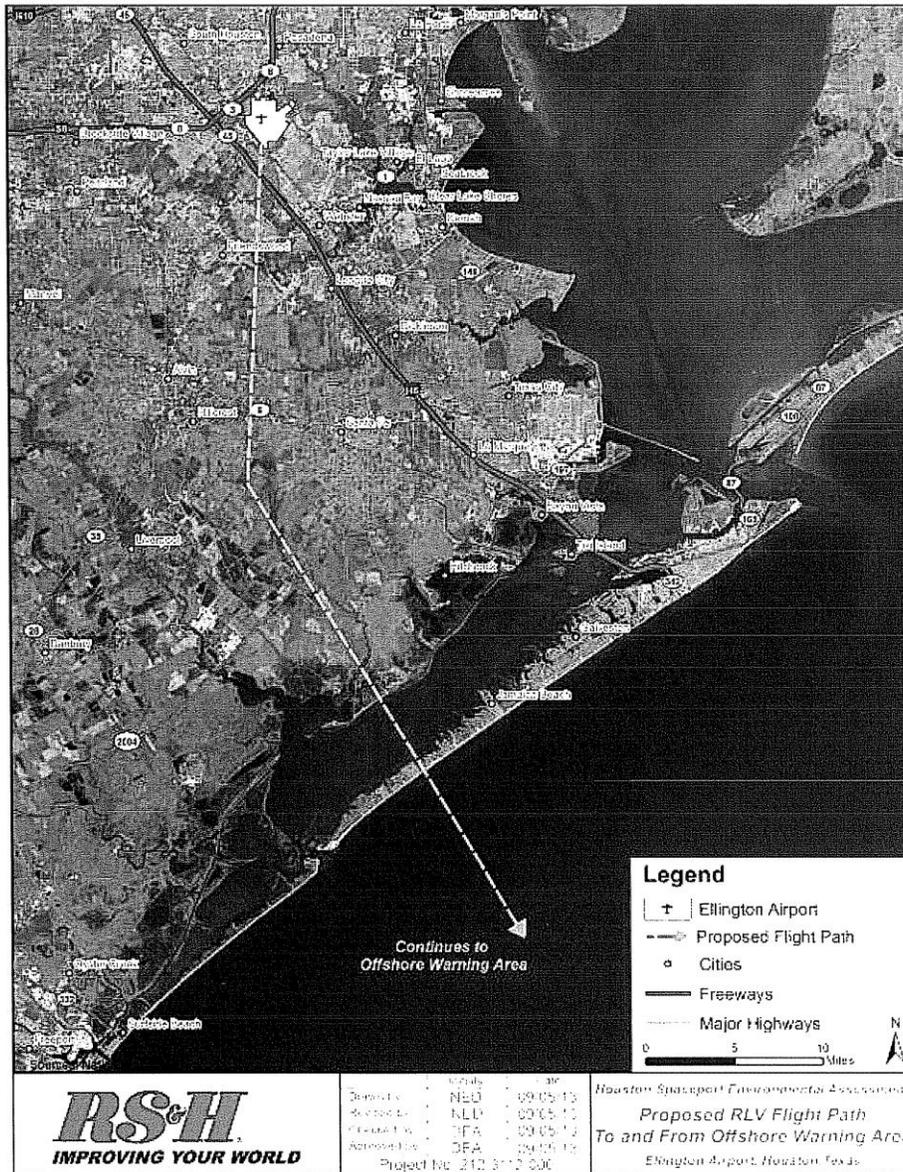
- 1 - Occurring at approximately > 40,000 feet mean sea level
- 2 - Launch vehicle carried via larger aircraft to designated launch area
- 3 - Carrier vehicle would land under conventional jet aircraft engine power.



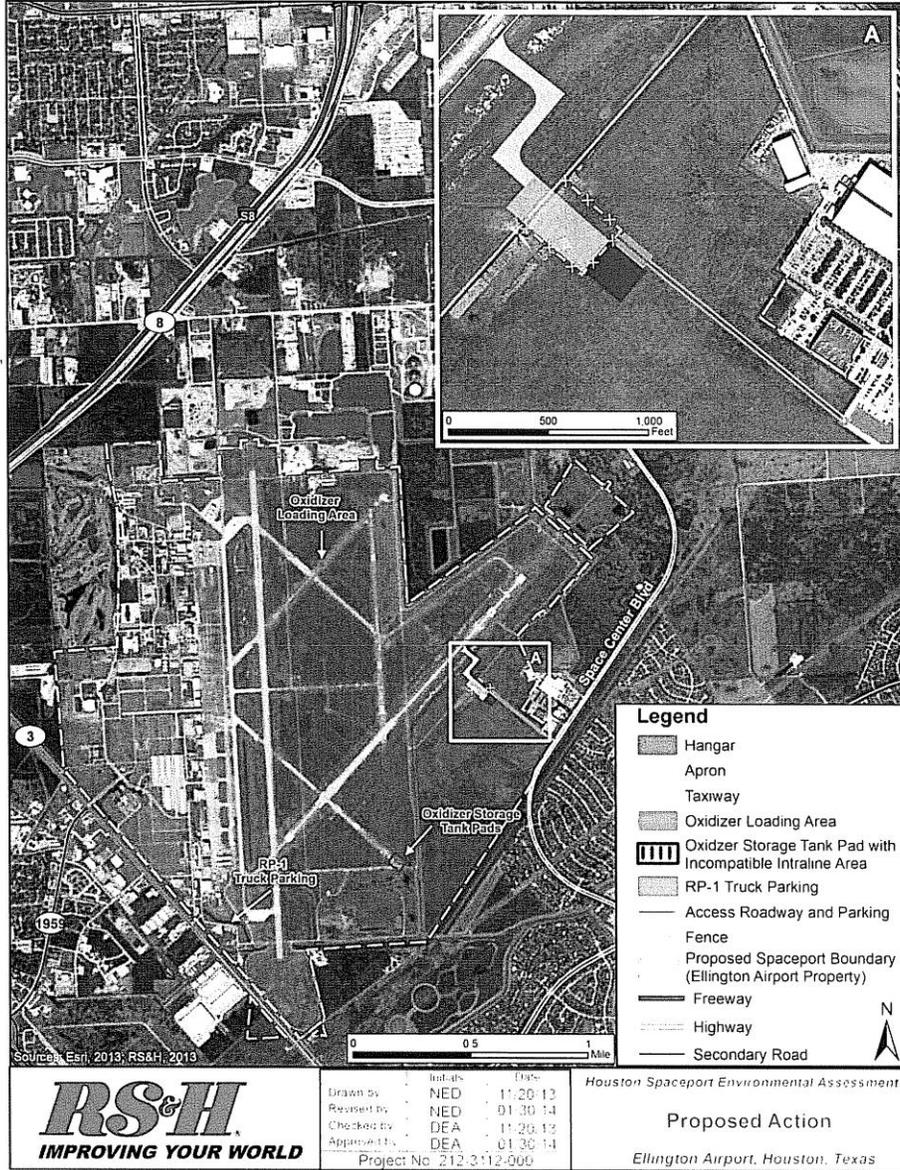
	Initials	Date
Drawn by	NED	09/05/13
Revised by	NED	01/30/14
Checked by	DEA	09/05/13
Approved by	DEA	01/30/14
Project No. 212-3112-000		

Houston Spaceport Environmental Assessment
 Examples of
 Concept X and Z Vehicles
 Ellington Airport, Houston, Texas

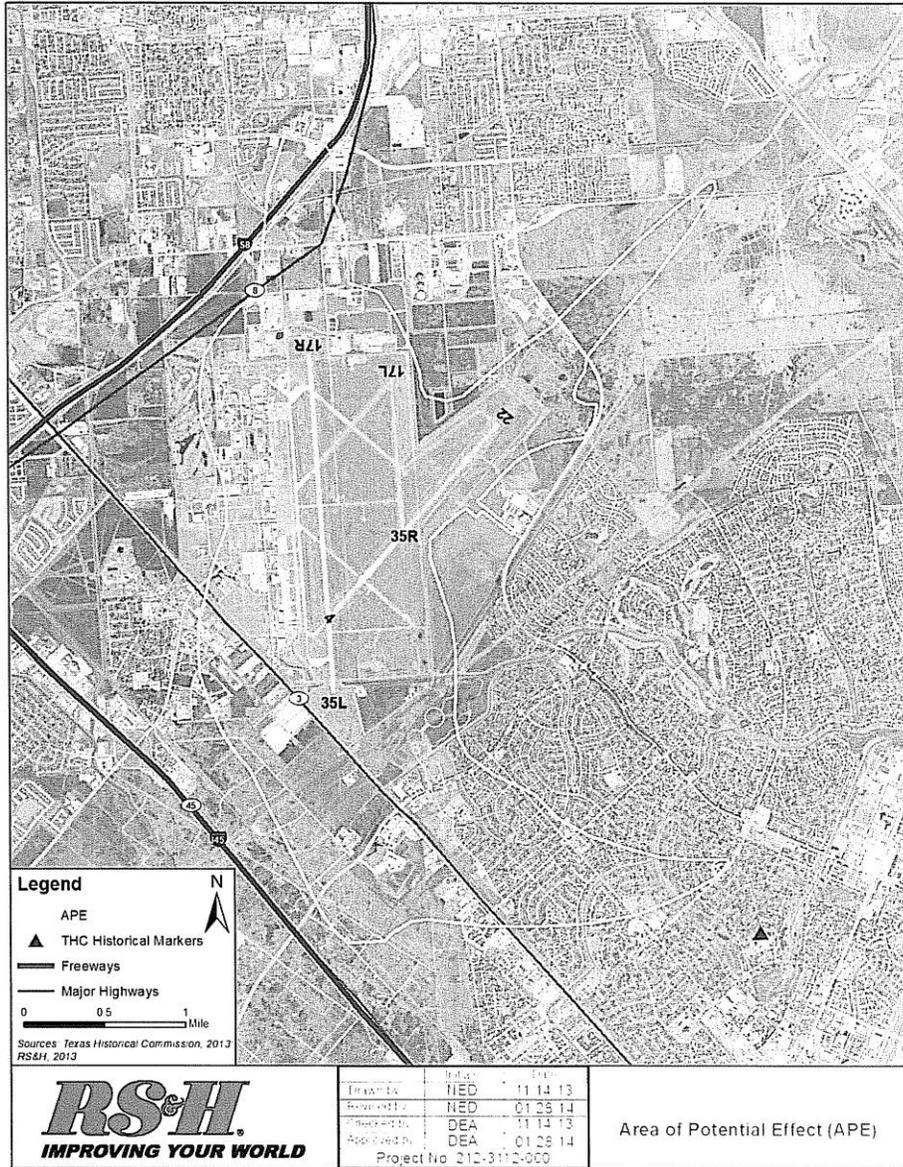
Attachment 3. Proposed Launch Vehicle Flight Path



Attachment 4. Proposed Spaceport Facilities and Infrastructure



Attachment 5. Area of Potential Effect



This Page Intentionally Left Blank

APPENDIX E

*AIRCRAFT NOISE AND
SONIC BOOM METHODOLOGY*

This Page Intentionally Left Blank

AIRCRAFT NOISE AND SONIC BOOM METHODOLOGY



U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

August 21, 2014

Daniel Murray
Office of Commercial Space Transport
Federal Aviation Administration
800 Independence Ave. SW
Washington, DC 20591

Dear Mr. Murray,

The Office of Environment and Energy (AEE) has reviewed the proposed non-standard noise modeling method for the launch noise associated with the proposed concept horizontal launch vehicles X and Z at the Houston Spaceport at Ellington Airport in Houston, Texas. This is in support of the noise impact analysis for the National Environmental Policy Act (NEPA) Environmental Assessment. In accordance with FAA Order 1050.1e, all non-standard noise analysis must be approved by AEE. This letter serves as AEE's response to the proposed noise method for the NEPA document.

The methodology is a quantitative analysis based on the Area Equivalent Method and PCBoom4. This method is based on the idea that the horizontal launch vehicles operate like jet aircraft when departing and arriving at airports and reaches a certain altitude and area before the vehicles ignite the rocket engines, either with the existing vehicle or the one component of the vehicle which will be used for sub-orbit flight. The FAA does not currently have an approved model for launch vehicles and the document includes a proposed noise modeling methodology for the horizontal launch vehicles. The proposed noise modeling method is based on the best available research and understanding given how the vehicles will be operating. In addition, to capture the sonic booms associated with the proposed launch vehicle booster return operations, the proponent will use PCBoom4, an FAA approved model.

Given the proposed launch noise method is based on the best available research on vehicle launches, this approach is appropriate for the NEPA document for the Houston Spaceport at Ellington Airport in Houston, Texas for the concept X and Z horizontal launch vehicles. AEE concurs with the launch noise methodology used for this project. Please understand that this approval is limited to this particular project and vehicles. Any additional projects using this or other launch noise methodologies or variations of launch vehicles not mentioned here will require separate approval.

Sincerely,

A handwritten signature in black ink, appearing to read "Rebecca Cointin".

Rebecca Cointin, Manager
AEE/Noise Division

HOUSTON SPACEPORT AT ELLINGTON AIRPORT

Summary of Aircraft Noise and Sonic Boom Methodology

Prepared For

**City of Houston - Houston Airport System
and
Federal Aviation Administration (AST and AEE)**

Prepared By



Version 2.0

TABLE OF CONTENTS

CHAPTER 1.....	3
1.1 Background.....	3
1.1.1 Existing Aircraft Operations.....	3
1.2 Launch Vehicles and Flight Path.....	3
1.2.1 Horizontal Reusable Launch Vehicles.....	3
1.2.2 Proposed RLV Flight Path.....	4
1.3 Noise Emissions	7
1.3.1 Aircraft Noise Emissions	7
1.3.2 Sonic Booms.....	8
1.4 Proposed Action Noise Analysis Methodology	9
1.4.1 Engine Noise	9
1.4.2 Sonic Boom	10

LIST OF FIGURES

Figure 1-1	Example Concept X Vehicle.....	5
Figure 1-2	Example Concept Z Vehicle	5
Figure 1-3	Potential Concept X and Z Flight Path to OWA 147C&D.....	6
Figure 1-4	A-, B-, and C- Weighting Functions	8
Figure 1-5	Concept X and Z Supersonic Profile	13

1.1 BACKGROUND

The Houston Airport System (HAS) proposes to obtain a Commercial Launch Site Operator License from the FAA Office of Commercial Space Transportation (AST) for the Houston Spaceport at Ellington Airport (EFD). This license would enable horizontal operations of reusable launch vehicles (RLV), thereby positioning EFD to accommodate a variety of potential launch customers.

As part of the licensing process, the National Environmental Policy Act (NEPA) requires the FAA to analyze the potential environmental impacts associated with the proposed operation of commercial launch sites. **This appendix provides the methodology for potential noise and sonic boom impacts related to conceptual RLV operations at Ellington Airport.**

1.1.1 Existing Aircraft Operations

There are existing aircraft engine noise emissions as a part of the civil and military operations at EFD. In 2011, the Airport conducted 114,702 operations. Of these, approximately 61% were general aviation, 32% military, 5% commuter, and 2% air carrier.¹ The large percentage of military operations is a function of activity by multiple active military and governmental agencies located at EFD: TxANG, TxARNG, the USCG, and NASA. Together these military and governmental agencies utilize a variety of jet aircraft at EFD, including F-16, T-38, C-9, and WB-57 aircraft, among others.

The FAA's Terminal Area Forecast indicates total operations, exclusive of spaceport operations, would equal 114,702 operations in 2015.

1.2 LAUNCH VEHICLES AND FLIGHT PATH

1.2.1 Horizontal Reusable Launch Vehicles

A horizontal RLV is a launch vehicle that utilizes aviation facilities to take off and land. Unlike vertically launched space vehicles, the operation of horizontal RLVs is similar to traditional airplanes. The current horizontal RLVs under consideration at Ellington Airport consist of two specific types: Concept X and Concept Z. The third type, a Concept Y vehicle, is not proposed to operate from Ellington Airport.

A summary of the key operational characteristics of the Concept X and Z vehicles is shown below.

Concept X - The Concept X is an all-in-one dual-propulsion vehicle, similar to an airplane. The Concept X vehicle takes off from a runway using jet power and flies to a designated operating area and altitude (typically approximately 40,000 feet mean sea level (msl)) before igniting its rocket engines to reach its apogee in sub-orbit. The Concept X RLV is able to land horizontally by either restarting its jet engines or by gliding (i.e., unpowered). **Figure 1-1** presents an example Concept X RLV.

Concept Z - The Concept Z RLV is a two-part vehicle consisting of a reusable carrier aircraft and a reusable or an expendable launch vehicle. The carrier aircraft is powered by jet engines

¹ FAA, APO Terminal Area Forecast Detail Report, January 2013, <http://aspm.faa.gov/main/taf.asp>, accessed September 2013.

and designed/modified to carry the captive launch vehicle to a designated operating area and altitude (up to 50,000 feet msl), where the two components separate and the rocket engines of the launch vehicle ignite. The carrier aircraft returns under jet power for a normal aircraft landing. The launch vehicle may conduct a glide return for a horizontal landing or be expended. **Figure 1-2** presents an example Concept Z vehicle.

1.2.2 Proposed RLV Flight Path

This section describes the proposed flight paths of the concept RLVs under the Proposed Action. The proposed flight path is depicted for environmental planning purposes and is being coordinated with applicable agencies.

As proposed, the RLVs would takeoff to the south from Runway 17R-35L at EFD. The coordinates for the departure and arrival routes were selected to provide a route that both minimizes the overflight of populated areas and minimizes the impact on existing aircraft routes in the area. The concept RLVs would fly from EFD to the Offshore Warning Area (OWA) W-147C and D (see **Figure 1-3**).

During navigation along these proposed departure and arrival routes, the Concept X and Z RLVs are operating in the fashion of a conventional aircraft. Rocket ignition would occur only within the designated RLV Operating area (i.e., OWA W-147C and D), over the Gulf of Mexico approximately 130 miles south of the continental U.S.

Figure 1-1
Example Concept X Vehicle

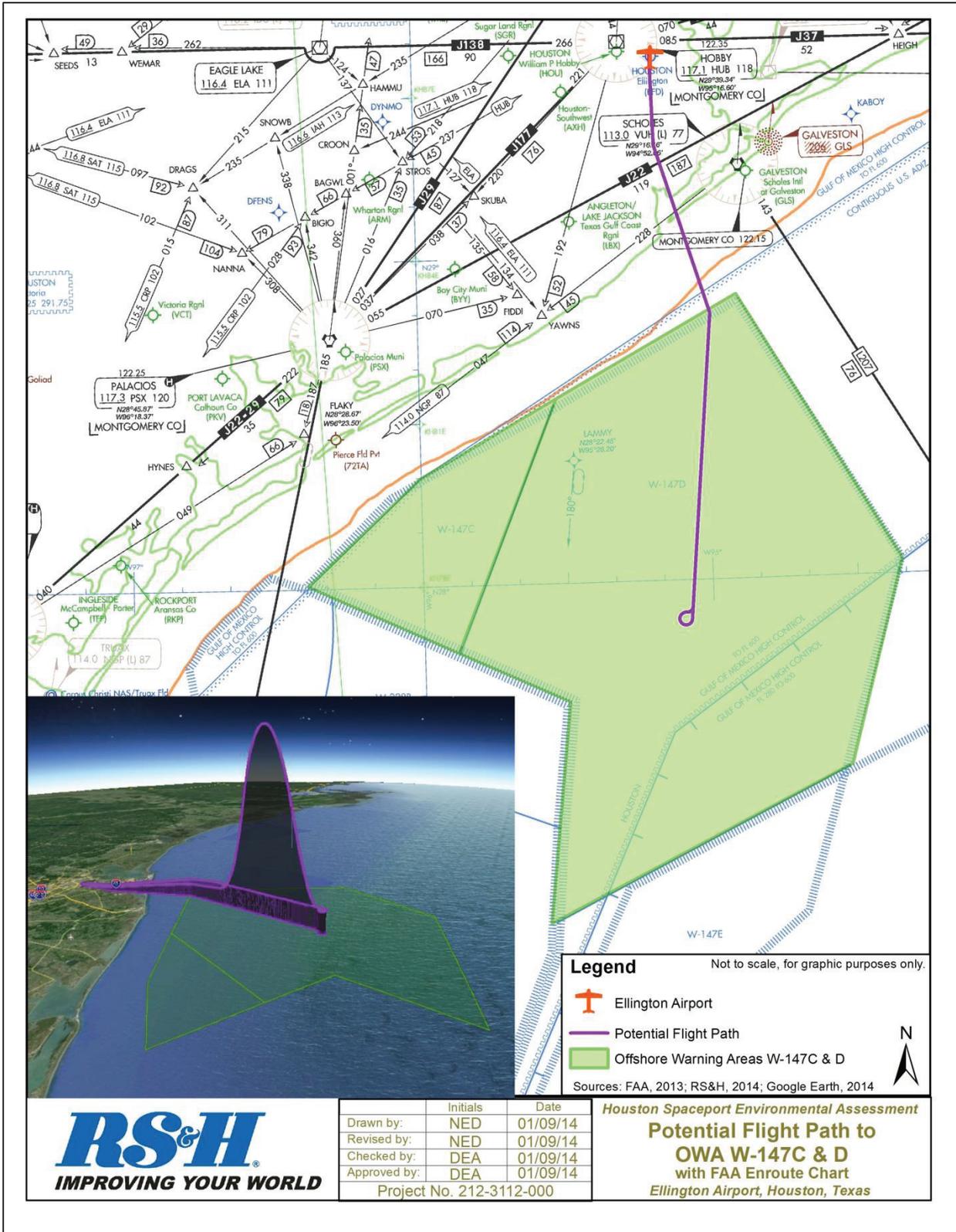


Figure 1-2
Example Concept Z Vehicle



Source: Virgin Galactic, 2011

Figure 1-3
 Potential Concept X and Z Flight Path to OWA 147C & D



1.3 NOISE EMISSIONS

This section describes background information associated with aircraft noise emissions and the generation of sonic booms.

1.3.1 Aircraft Noise Emissions

The primary mechanism of aircraft noise emissions results from air pressure fluctuations induced from the operation of aircraft during the various phases of flight. While pressure fluctuations from an aircraft can originate from aerodynamic forces or mechanical systems, the majority of aircraft noise is the result of engine operation. Jet engines induce a turbulent mixing of the atmosphere that creates compression and rarefaction of the ambient atmosphere, which causes air pressure fluctuations. If these fluctuations have the appropriate frequency and are strong enough, they can be perceived as audible sound.

Aircraft noise emissions are often the most noticeable environmental effect of aviation operations. As with other environmental issues, the potential impact of noise emissions from aircraft is a function of a number of interacting variables, including sound level, duration, time of day, and frequency of occurrence. Quantifying the potential impact of aircraft sound emissions considers the quantitative aspects of aircraft sound emissions relative to subjective human perceptions of disturbance.

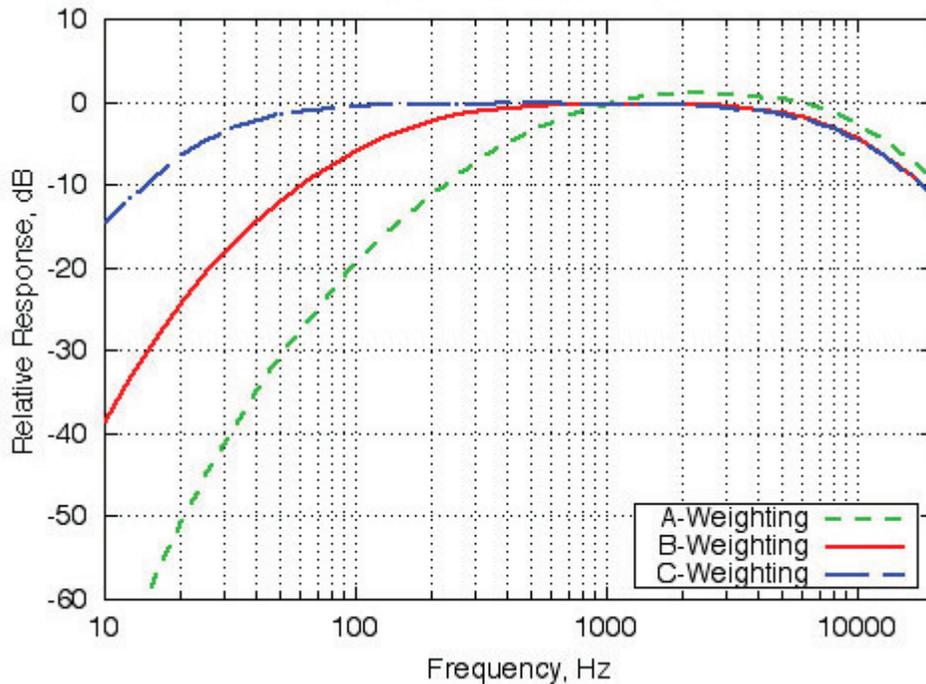
Human perception of sound pressure fluctuations is described and measured in units of decibels (dB). The threshold of human perception of sound begins at 0 dB, with 120 dB typically considered the threshold for physical discomfort. The human ear is capable of hearing the sound pressure across the frequency range of 20 Hertz (Hz) to 20,000 Hz. To account for the frequency or pitch of the sound pressure fluctuations, decibels are typically converted to A-weighted decibels. The A-weighting, described in International Standard 61672:2003, is the frequency metric utilized by the FAA and the recognized frequency adjustment to account for human response to noise. A-weighting effectively filters out both high and low frequencies to approximate the sensitivity of the human ear. Impulsive sounds (e.g., sonic booms) typically utilize C-weighting, which includes a greater range of lower frequencies. **Figure 1-4** shows a comparison of the A- and C- Weighting Functions.

In addition to the noise frequencies, research² shows that the loudness of individual events, the number of events during a given period, and the time of day in which noise events occur influence human perception of, and therefore sensitivity to, that noise. The cumulative effect of individual sound events on a community over time is calculated with a metric known as the Day-Night Average Sound Level (DNL). The DNL takes into account the exposure, duration, time of day, and number of sound events averaged over a 12-month period.

In 1981, the FAA and EPA determined that the DNL is the appropriate metric to assess noise impacts on humans. In 1992, the FAA confirmed that determination after finding the DNL metric accurately predicts those noise levels causing annoyance.

² Federal Agency Review of Selected Airport Noise Analysis Issues, Federal Interagency Committee on Noise (FICON) 1992.

Figure 1-4
A-, B-, and C- Weighting Functions



Source: Castle Group 2013.

The FAA considers a significant noise impact to occur if analysis shows that a proposed action increases sound levels in sensitive areas by DNL 1.5 dB or more at or above the DNL 65 dB exposure level when compared to a no action alternative for the same period (FAA Order 1050.1E, Change 1, Appendix A, Section 14.3).

1.3.2 Sonic Booms

Noise emissions of concept RLVs can result from the generation of sonic booms.

The movement of any aircraft traveling in the atmosphere creates a series of pressure waves due to the compression of air in front of a moving aircraft. These pressure waves travel ahead of the aircraft at the speed of sound. When an aircraft's speed becomes such that it begins to exceed its own pressure wave, the waves are compressed to a point where a shockwave is formed. This shockwave is known as a sonic boom, and is created when the aircraft passes the speed of sound, commonly referred to as Mach 1.

The sonic boom shockwave produces a transient increase in air pressure, known as overpressure, which is a pressure greater than the ambient atmospheric pressure. Depending on atmospheric attenuation and absorption, sonic boom pressure fluctuations created by an aircraft in flight may have the potential to be heard at ground level. Factors influencing the intensity of the shockwave include vehicle size and weight, altitude, maneuvering, and vehicle shape. Because the pressure fluctuations contain low frequency sound energy, observers hear them as a sound similar to a thunderclap.

The sound energy associated with sonic booms has the potential for human disturbance. The impact of impulsive sounds such as sonic booms has been found to correlate with C-weighted DNL (CDNL).³ The C-weighting used by CDNL emphasizes low frequency sound between 25 Hz and 10,000 Hz. Research⁴ demonstrates that the human perception of CDNL is related to an equivalent A weighted DNL.

1.4 PROPOSED ACTION NOISE ANALYSIS METHODOLOGY

The Proposed Action for the licensing process includes up to 50 departures and arrivals per year of a horizontal reusable launch vehicle. Under the Proposed Action this change in operations would equal a 0.09 percent increase in total annual operations. This section describes the methodology to perform a thorough noise impact analysis for the Proposed Action.

Activities associated with the Proposed Action potentially affecting noise levels include noise generated during departure, flight, and arrival. This methodology addresses the potential noise impacts that may occur due to operations of horizontal RLVs at Ellington Airport. The following subsections describe the methodology of the RLV engine and sonic boom noise emissions of Concept X and Z vehicles.

1.4.1 Engine Noise

The FAA's Area Equivalent Method (AEM) is the initial method of quantifying a proposed action's potential impact from engine noise. The AEM uses a mathematical procedure to estimate a change in the area of the DNL 65 noise contour that would occur if the number and/or type of aircraft operations were to change. According to FAA Order 1050.1E, Change 1, if the AEM calculations indicate that a proposed action would result in less than a 17 percent (approximately a DNL 1 dB) increase in the DNL 65 dB contour area, it may be concluded that there would be no significant impact over noise sensitive areas and that no further noise analysis is required.⁵

Concept X Representative AEM Vehicle – As described in **Section 1.2**, a Concept X vehicle operating at EFD would take off and depart horizontally. It would then depart from EFD to an offshore location, where it would climb to a high altitude prior to igniting its rocket engines to complete its ascent. Upon return, the Concept X vehicle would return for a horizontal landing by either restarting its jet engines or by gliding.

Based on current information from Concept X vehicle developers, an appropriate representative aircraft will be utilized in the AEM model to best model the acoustic parameters of engine noise from the Concept X vehicle.

Concept Z Representative AEM Vehicle – As described in **Section 1.2**, Concept Z vehicles consist of a two-part vehicle comprising a reusable carrier aircraft and a reusable or an expendable launch vehicle. The carrier aircraft is powered by jet engines and designed/modified to carry the launch vehicle to a high altitude, where the two components detach and the rocket engine of the launch vehicle is ignited. The carrier aircraft flies back to EFD as a conventional aircraft under jet engine power. The launch vehicle, which can be either suborbital or orbital,

³ Assessment of community response to impulsive noise, Journal of The Acoustical Society of America, (1985).

⁴ Community Response to High-Energy Impulsive Sounds, Committee on Hearing and Bioacoustics (CHABA) 1996.

⁵ FAA Order 1050.1E, Change 1, *Policies and Procedures for Considering Environmental Impacts* (2006).

completes its operation and either returns to EFD as a glider for a horizontal landing or is expended.

Based on current information from Concept Z vehicle developers, an appropriate representative aircraft will be utilized in the AEM model to best model the acoustic parameters of engine noise from the Concept Z vehicle

1.4.2 Sonic Boom

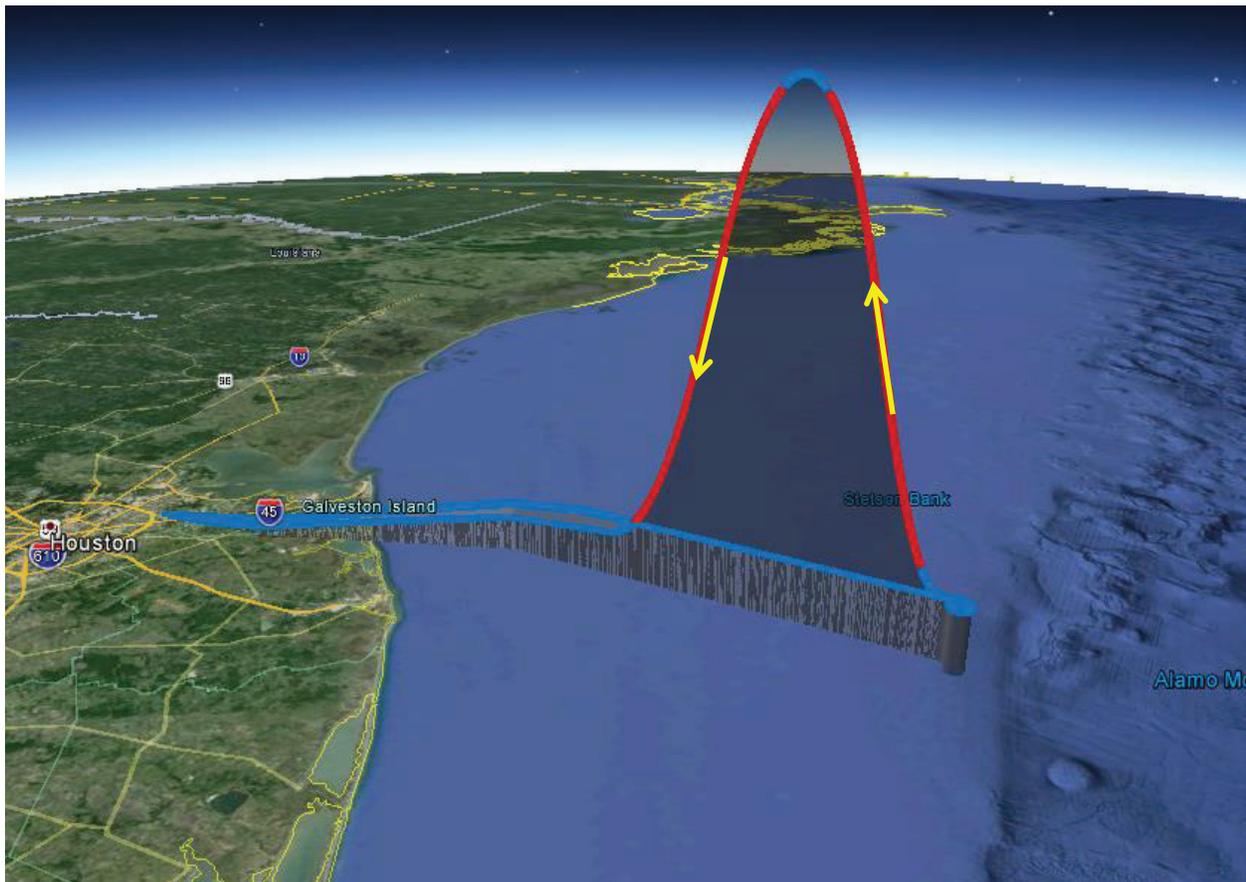
In order to achieve their desired flight profiles, Concept X and Z vehicles must fly at supersonic speeds. Therefore, the operation of these vehicles traveling past Mach 1 will create sonic boom overpressures. The ground area and intensity of the resulting sonic boom depends on a number of factors, including vehicle geometry, atmospheric conditions, and flight profile trajectory.

To accurately account for these factors and determine the potential impact of sonic boom generation, PCBoom4, a single-event prediction model, is proposed to be used to predict the sonic boom footprint for Concept X and Z vehicle operations. PCBoom4, produced by Wyle Laboratories, has been in use for many years, is utilized by the Air Force Center for Engineering and Environment, and is widely accepted to determine the specific pattern and amplitude of a sonic boom footprint.⁶

Figure 1-5 depicts the proposed flight track for the Concept X and Z vehicles. The red portions represent the periods of supersonic flight and the yellow arrows show the direction of flight.

⁶ WR 02-11 Computer Models for Sonic Boom Analysis, Wyle Laboratories (2002)

Figure 1-5
Concept X and Z Supersonic Profile



Source: RS&H, 2014

APPENDIX F

PUBLIC INVOLVEMENT

This Page Intentionally Left Blank

APPENDIX F-1

PUBLIC INVOLVEMENT DOCUMENTATION

This Page Intentionally Left Blank

**Public Involvement
Documentation**

for the

**Houston Spaceport
Environmental Assessment**



January 2015

TABLE OF CONTENTS

Houston Spaceport Public Meeting Houston, Texas

Section 1	Summary	3
Section 2	Early Coordination Announcement	5
	▪ Early Coordination Letter with Mailing List, October 11, 2013.....	6
Section 3	Draft EA Notice of Availability and Public Meeting Notification	14
	▪ Federal Aviation Administration Website Notice, December 30, 2014	15
	▪ Federal Register Notice, December 31, 2014	17
	▪ Notice of Availability Flyer with Distribution List, December 31, 2014	19
	▪ Houston Chronicle Legal Notice, January 7, 2015	27
	▪ Bay Area Citizen Display Ad, January 8, 2015.....	29
	▪ Friendswood Journal and Pearland Journal Display Ad, January 8, 2015 ...	31
	▪ Pasadena Citizen Display Ad, January 8, 2015	33
Section 4	Open House Public Meeting	35
	▪ Photographs.....	36
	▪ Sign-In Sheets	37
	▪ Meeting Handout and Exhibit Boards.....	48
	▪ Media Packet	58

Public Involvement Documentation Houston Spaceport Environmental Assessment

Summary

In accordance with NEPA, CEQ Regulations, FAA Order 1050.1E, and FAA Order 5050.4B, the FAA implemented a public involvement program for the Houston Spaceport Environmental Assessment (EA). Public participation in the NEPA process not only provides for and encourages open communication between the FAA and the public, but also promotes better decision making.

Early Coordination

On November 11, 2013, the FAA mailed an early coordination letter to Federal, state and local elected officials, governmental resource agencies and airport tenants. The purpose of the letter was to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport. The FAA received letters from 12 different agencies and tenants.

Draft EA Notice of Availability and Notice of Public Meeting

The FAA published a "Notice of Availability and Request for Comment on the Draft EA" in the *Federal Register* on December 31, 2014, which started the 30-day public review and comment period for the Draft EA. A notice was also published in several local newspapers including the Houston Chronicle on January 7, 2015 and the Bay Area Citizen, Pasadena Citizen, Friendswood Journal and Pearland Journal on January 8, 2015. The FAA mailed notices of availability to 84 Federal, state and local agencies as well as copies of the Draft EA to the following agencies:

- U.S. Coast Guard (USCG)
- U.S. Environmental Protection Agency (USEPA)
- U.S. National Park Service (USNPS)
- U.S. Fish and Wildlife Service (USFWS)
- Texas Air National Guard (TANG)
- Texas Commission on Environmental Quality (TCEQ) - Region 12
- Texas Department of Transportation (TxDOT)
- Texas General Land Office (TGLO) - Coastal Resources
- State Historic Preservation Officer (SHPO) - Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- Houston-Galveston Area Council (H-GAC)
- Harris County Public Health and Environmental Services (HCPHES)
- Harris County Public Infrastructure Development (HCPID)
- National Aeronautics and Space Administration (NASA)

An electronic version of the Draft EA was also made available on the FAA website. In addition, the FAA printed and mailed a copy of the Draft EA to the following libraries for public viewing:

- Clear Lake City-County Freeman Branch Library - 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library - 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library - 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library - 8005 Barry Avenue, Hitchcock, TX 77563

Open House Public Meeting

The FAA held an open house public meeting on January 22, 2015 from 5:30 pm to 8:30 pm at Space Center Houston, Silvermoon Conference Room, 1601 NASA Parkway, Houston, Texas, 77058. The purpose of the meeting was to discuss the Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas. A total of 67 individuals attended the meeting.

Participants signed in and received a nametag, a meeting handout and a comment form. Poster boards located throughout the open house provided information about FAA's role, the proposed action, alternatives, reusable launch vehicles, NEPA, potential environmental effects, and how the public could participate in the process. Representatives of the Federal Aviation Administration, Houston Airport System, and the consultant team were available to discuss the project and answer questions. A comment box was available to capture written comments and a stenographer was present to record verbal comments. Comments could also be mailed or emailed before the end of the comment period on January 31, 2015. The FAA received a total of 10 written comments and one oral comment.

Early Coordination Announcement



10748 Deerwood Park Blvd South
Jacksonville, Florida 32256
Voice 904 256 2500
Fax 904 256 2502

10/11/13

Mr. Ken Gidlow
Aerospace Engineer
Office of Commercial Space Transportation
Federal Aviation Administration
2101 NASA Parkway, MC ON, B4S, Room 4403A
Houston, TX 77058

RE: Early Coordination for an Environmental Assessment for a Proposed Houston Spaceport at Ellington Airport, Harris County, Houston, Texas

Dear Mr. Gidlow:

The purpose of this letter is to seek input concerning potential environmental impacts that may be associated with the construction of initial spaceport facilities and operation of horizontally launched reusable launch vehicles (RLVs) at Ellington Airport (see **Attachment 1**).

The City of Houston, Houston Airport System (HAS) is seeking a launch site operator's license to allow for the horizontal departure and landing of winged RLVs at Ellington Airport. The Federal Aviation Administration, Office of Commercial Space Transportation (FAA/AST) will review the license application based on several factors, including the completion of an Environmental Assessment (EA). HAS selected RS&H to conduct the technical and analytical studies required for a launch site operator's license application, including the EA.

The Proposed Action includes acquisition of a launch site operator's license, the construction of initial spaceport facilities, apron area, vehicle access, stormwater treatment, and other initial infrastructure (i.e., an oxidizer loading area) necessary to accommodate either a Concept X or Z vehicle and support equipment. The initial infrastructure would be sized to house either RLV and would be comparable in size, construction, and operation to existing on-Airport corporate hangars and office facilities. Should Ellington Airport need additional spaceport facilities beyond the Proposed Action, environmental approvals will be completed accordingly.

Attachment 2 shows examples and descriptions of the RLV concept vehicles. The winged RLVs would operate similarly to today's aircraft and use common fuels for propulsion, such as Jet A. The rockets used by the RLVs use refined kerosene similar to Jet A (RP-1) or solid hybrid fuels chemically similar to rubber or paraffin, and oxidizers such as liquid oxygen, nitrous oxide or hydrogen peroxide. No hypergols or other hazardous materials are used in these vehicles. At this time, it is anticipated that the RLVs would follow a southerly flight path toward the Gulf of Mexico to conduct its operation to suborbital altitudes (see **Attachment 3**).

Proposed are approximately up to 50 total commercial RLV operations per year; significantly lower than the current number of aircraft operations at Ellington Airport (FAA Terminal Area Forecast - 2012 – approximately 145,000 total operations). The development of vehicle operating/safety areas

and established operating procedures associated with the launch site operator's license application (14 CFR Part 420) will help to ensure the safety of the RLV and the uninvolved public.

In preparing the EA, RS&H will meet the requirements of the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA); FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, Change 1, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The EA will evaluate the potential direct, indirect, and cumulative environmental effects associated with the Proposed Action and analyze reasonable alternatives to the Proposed Action; including a No-Action Alternative.

On behalf of HAS, RS&H is sending this early notification letter to:

1. Advise you of the preparation of the EA;
2. Seek any relevant information you may have regarding the environment (e.g., human, natural, or physical) within the vicinity of Ellington Airport; and
3. Solicit early environmental comments and concerns regarding potential environmental, social, and economic issues for consideration during preparation of the EA.

We would appreciate any information and/or comments you would like to contribute. Your input will be useful to HAS, RS&H, and the FAA/AST for making the most informed decisions throughout the EA process. You may send (via post or email) information and/or comments by **November 11, 2013** to:

Reynolds, Smith and Hills, Inc.
Attn. David Alberts
10748 Deerwood Park Boulevard South
Jacksonville, FL 32256-0597
David.Alberts@rsandh.com

Thank you for your interest in this project and we look forward to working with you as we prepare this EA. If you have any questions, or would like additional information regarding the Proposed Action, please do not hesitate to contact me.

Sincerely,



David E. Alberts
Southeast Region Environmental Service Group Leader

Attachments: Attachment 1 – Location Map
Attachment 2 – Example of Concept X and Z Vehicles
Attachment 3 – Sample Flight Path

Cc: Arturo Machuca, Houston Airport System
Carlos Ortiz, Houston Airport System
Dan Czelusniak, FAA/AST
File

Attachment 1 Location Map



Sources: National Geographic, 2012; Esri, 2012; RS&H, 2013

	Drawn by:	Initials	Date
	Revised by:	NED	09/05/13
	Checked by:	DEA	09/05/13
	Approved by:	DEA	09/05/13
	Project No. 212-3112-000		

**Houston Spaceport
Environmental Assessment**

Location Map

Ellington Airport, Houston, Texas

Attachment 2 Concept X and Z Vehicle Examples

Concept X Vehicle Examples



Concept Z Vehicle Examples



Reusable Launch Vehicle	Takeoff Power Source	Power Source to Reach Sub-orbital Altitude ¹	Power Source to Land at Spaceport
Concept X	Aircraft engine	Rocket engine	Aircraft engine/glide
Concept Z	Aircraft engine ²	Rocket engine	Glide, no power ³

Notes:

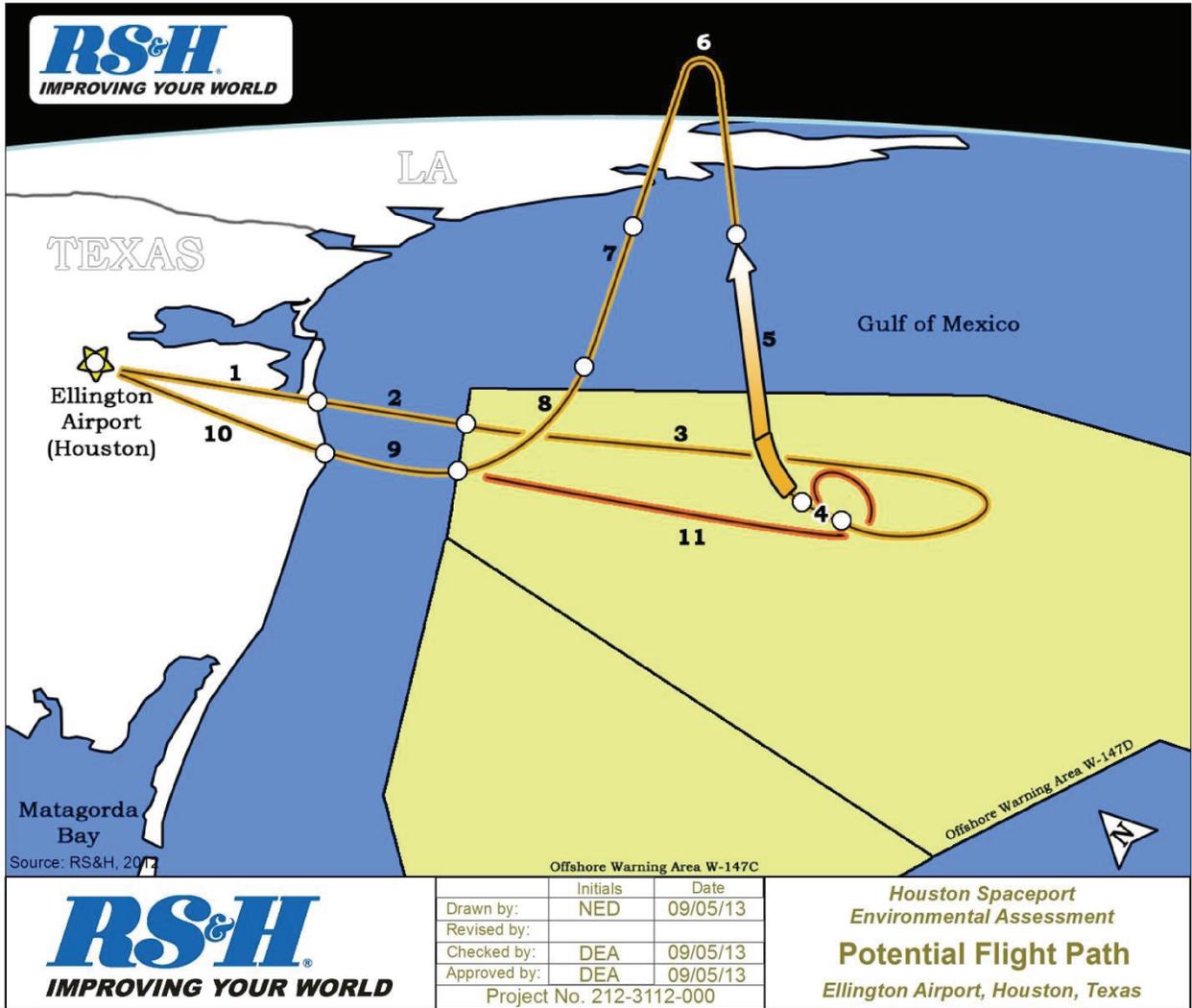
- 1 - Occurring at approximately > 40,000 feet mean sea level
- 2 - Launch vehicle carried via larger aircraft to designated launch area
- 3 - Carrier vehicle would land under conventional jet aircraft engine power.



	Initials	Date
Drawn by:	NED	09/05/13
Revised by:		
Checked by:	DEA	09/05/13
Approved by:	DEA	09/05/13
Project No. 212-3112-000		

*Houston Spaceport
Environmental Assessment*
**Examples of
Concept X and Z Vehicles**
Ellington Airport, Houston, Texas

Attachment 3
 Sample Flight Path



Houston Spaceport

Mailing List for Early Notification Letters Mailed on 10/11/2013

Type	Title	FName	LName	Position	Organization	Dist/Dept/Div	Mailing Address	City	ST	Zip
Federal	Mr.	Ken	Gidlow	Aerospace Engineer	Federal Aviation Administration	Office of Commercial Space Transportation	2101 NASA Parkway, MC ON, B4S, Room 4403A	Houston	TX	77058
Federal	Mr.	Daniel	Czelusniak	Environmental Protection Specialist	Federal Aviation Administration	Office of Commercial Space Transportation	800 Independence Avenue, SW, Suite 325	Washington	DC	20591
Federal	Ms.	Stacey	Zee	Environmental Protection Specialist	Federal Aviation Administration	Office of Commercial Space Transportation	801 Independence Avenue, SW, Suite 325	Washington	DC	20592
Federal	Mr.	Cameron	Bryan	Planning and Programming Manager	Federal Aviation Administration	Southwest Region	2602 Meacham Boulevard, Room 610	Fort Worth	TX	73138
Federal	Ms.	Teresa	Bruner	Regional Administrator	Federal Aviation Administration	Southwest Region	2601 Meacham Boulevard	Fort Worth	TX	76137
Federal	Mr.	Dean	McMath	Regional Environmental Team Leader	Federal Aviation Administration	Southwest Region	2601 Meacham Boulevard, Room 697	Fort Worth	TX	73137
Federal	Mr.	Tony	Robinson	Regional Administrator	Federal Emergency Management Agency	Region 6	FRC 800 North Loop 288	Denton	TX	76209
Federal	Mr.	Robert	Tally	Division Administrator	Federal Highway Administration	Texas Division	300 E. 8th Street, Room 826	Austin	TX	78701
Federal	Dr.	Ellen	Ochoa	Director	NASA	Johnson Space Center	2101 NASA Parkway	Houston	TX	77058
Federal	Ms.	Tina	Norwood	NASA NEPA Manager	National Aeronautics and Space Administration	Environmental Management Division	300 E Street SW, Suite 5B11	Washington	DC	20546
Federal	Dr.	Roger	Zimmerman	Lab Director	National Oceanic and Atmospheric Administration	National Marines Fisheries Service, Galveston Laboratory	4700 Avenue U	Galveston	TX	77551
Federal	Mr.	Salvador	Salinas	State Conservationist	Natural Resources Conservation Services	Texas State Office	101 South Main Street	Temple	TX	76501
Federal	Col.	Richard P.	Pannell	Commanding Officer	U.S. Army Corps of Engineers	Galveston District	P.O. Box 1229	Galveston	TX	77553
Federal	Mr.	Dan	Deerinwater	Regional Director	U.S. Bureau of Indian Affairs	Southern Plains Region	P.O. Box 368	Anadarko	OK	73005
Federal	Ms.	Jennifer	Montoya	Resource Management Plans Team Leader	U.S. Bureau of Land Management	Las Cruces District Office	1800 Marquess Street	Las Cruces	NM	88005
Federal	Mr.	Mark	Trevino	Area Manager	U.S. Bureau of Reclamation	Oklahoma-Texas Area Office	5316 Highway 290 West, Suite 110	Austin	TX	78735
Federal	Capt.	Brian	Penoyer	Commander	U.S. Coast Guard	Houston-Galveston Sector	9640 Clinton Drive	Houston	TX	77029
Federal	CDR	Scott E.	Langum	Commanding Officer	U.S. Coast Guard Air Station Houston		1178 Ellington Field, Sneider	Houston	TX	77034
Federal	Ms.	Barbara R.	Britton	Regional Environmental Officer	U.S. Department of Housing and Urban Development	Region VI	801 Cherry Street, Room 2862	Fort Worth	TX	76102
Federal	Mr.	Stephen	Spencer	Regional Environmental Officer	U.S. Department of Interior	Office of Environmental Policy and Compliance, Albuquerque Regional Office	1001 Indian School Road, NW, Suite 348	Albuquerque	NM	87104
Federal	Mr.	Mark	Briggs	Director	U.S. Department of Labor	Occupational Safety & Health Administration, Houston South Area Office	17625 El Camino Real, Suite 400	Houston	TX	77058
Federal	Ms.	Rhonda	Smith	Chief	U.S. Environmental Protection Agency	Office of Planning and Coordination (6EN-XP)	1445 Ross Avenue	Dallas	TX	75202
Federal	Mr.	Ron	Curry	Regional Administrator	U.S. Environmental Protection Agency	South Central Region, Region 6	1445 Ross Avenue, Suite 1200	Dallas	TX	75202
Federal	Mr.	Edith	Erfling	Project Leader	U.S. Fish and Wildlife Service	Ecological Services Field Office	17629 El Camino Real, #211	Houston	TX	77058
Federal	Mr.	Denise	Baker	NEPA Regional Coordinator	U.S. Fish and Wildlife Service	Southwest Region	P.O. Box 1306	Albuquerque	NM	87103
Federal	Ms.	Liz	Agpaoa	Regional Forester	U.S. Forest Service	Southern Region	1720 Peachtree Road NW	Atlanta	GA	30309
Federal	Ms.	Marjorie McColl	Petty	Regional Director	U.S. Health and Human Services	Region VI	1301 Young Street, Suite 1124	Dallas	TX	75202
Federal	Mr.	John	Wessels	Regional Director	U.S. National Park Service	Intermountain Region	12795 Alameda Parkway	Denver	CO	80225
Federal	The Hon.	Randy	Weber	Congressman	U.S. House of Representatives	District 14	174 Calder Road	League City	TX	77573
Federal	The Hon.	Pete	Olson	Congressman	U.S. House of Representatives	District 22	6302 W. Broadway Street, Suite 220	Pearland	TX	77581
Federal	The Hon.	Gene	Green	Congressman	U.S. House of Representatives	District 29	11811 I-10 East, Suite 430	Houston	TX	77029
Federal	The Hon.	Steve	Stockman	Congressman	U.S. House of Representatives	District 36	8060 Spencer Highway, San Jacinto College, Building 1, Room 108	Pasadena	TX	77505
Federal	The Hon.	John	Cornyn	Senator	U.S. Senate		5300 Memorial Drive, Suite 980	Houston	TX	77007
Federal	The Hon.	Ted	Cruz	Senator	U.S. Senate		1919 Smith Street, Suite 800	Houston	TX	77002

Houston Spaceport

Mailing List for Early Notification Letters Mailed on 10/11/2013

Type	Title	FName	LName	Position	Organization	Dist/Dept/Div	Mailing Address	City	ST	Zip
State	Mr.	Milton	Rister	Executive Director	Railroad Commission of Texas		P.O. Box 12967	Austin	TX	78711
State	Col.	Terence	Winkler	Wing Commander	Texas Air National Guard	147th Reconnaissance Wing	14657 Sneider	Houston	TX	77034
State	Ms.	Ashley K.	Wadick	Regional Director	Texas Commission on Environmental Quality		5425 Polk Street, Suite H	Houston	TX	77023
State	Mr.	David	Brymer	Assistant Director	Texas Commission on Environmental Quality	Air Quality Division	P.O. Box 13087, MC 206	Austin	TX	78711
State	Ms.	Kellye	Rila	Director	Texas Commission on Environmental Quality	Water Availability Division	P.O. Box 13087, MC 160	Austin	TX	78711
State	Ms.	Jennifer	Bailey	Regional Director	Texas Department of Agriculture	Gulf Coast Region (Region 3)	5425 Polk Street, Suite G-20	Houston	TX	77023
State	Dr.	Brian	Smith	Acting Regional Medical Director	Texas Department of State Health Services	Health Service Region 6/5 South-Houston	5425 Polk, Suite J, MC 1906	Houston	TX	77023
State	Mr.	David	Fulton	Director	Texas Department of Transportation	Aviation Division	125 E. 11th St.	Austin	TX	78701
State	Mr.	Michael W.	Alford	District Engineer	Texas Department of Transportation	Houston District	P.O. Box 1386	Houston	TX	77251
State	Mr.	Michael L.	Williams	Commissioner of Education	Texas Education Agency		1701 N. Congress Avenue	Austin	TX	78701
State	Ms.	Helen	Young	Deputy Commissioner	Texas General Land Office	Coastal Resources	P.O. Box 12873	Austin	TX	78711
State	Mr.	Jeffrey	Davis	Field Office Director	Texas General Land Office	La Porte Field Office, Region II	P.O. Box 1675	Galveston	TX	77553
State	Ms.	Tara Ellis	Mealy	Biologist	Texas General Land Office	Upper Coast	P.O. Box 1675	Galveston	TX	77553
State	Mr.	Mark	Wolfe	Executive Director & SHPO	Texas Historical Commission		P.O. Box 12276	Austin	TX	78711
State	Mr.	Carter	Smith	Executive Director	Texas Parks and Wildlife Department		4200 Smith School Road	Austin	TX	78744
State	Ms.	Rebecca	Hensley	Regional Director	Texas Parks and Wildlife Department	Science and Policy Resources	1502 FM 517 East	Dickinson	TX	77539
State	The Hon.	Rick	Perry	Governor	State of Texas		P.O. Box 12428	Austin	TX	78711
State	The Hon.	Craig	Eiland	State Representative	Texas House of Representatives	District 023	9702 E.F. Lowery Expressway	Texas City	TX	77591
State	The Hon.	Greg	Bonnen	State Representative	Texas House of Representatives	District 024	174 Calder Road, Suite 116	League City	TX	77573
State	The Hon.	Dennis	Bonnen	State Representative	Texas House of Representatives	District 025	122 E. Myrtle	Angleton	TX	77515
State	The Hon.	Ed	Thompson	State Representative	Texas House of Representatives	District 029	P.O. Box 2910	Austin	TX	78768
State	The Hon.	Wayne	Smith	State Representative	Texas House of Representatives	District 128	909 Decker Drive, Suite 104	Baytown	TX	77520
State	The Hon.	John E.	Davis	State Representative	Texas House of Representatives	District 129	1350 NASA Parkway, #212	Houston	TX	77058
State	The Hon.	Alma A.	Allen	State Representative	Texas House of Representatives	District 131	10101 Fondren Road, Suite 500	Houston	TX	77096
State	The Hon.	Carol	Alvarado	State Representative	Texas House of Representatives	District 145	2900 Woodridge Drive, Suite 305	Houston	TX	77087
State	The Hon.	Garnet F.	Coleman	State Representative	Texas House of Representatives	District 147	5445 Almeda, Suite 501	Houston	TX	77004
State	The Hon.	Sylvia R.	Garcia	State Senator	Texas State Senate	District 06	5425 Polk Street, Suite 125	Houston	TX	77023
State	The Hon.	Larry	Taylor	State Senator	Texas State Senate	District 11	174 Calder Road, Suite 151	League City	TX	77573
State	Mr.	Denise S.	Francis	Single Point of Contact	Governor's Office of Budget and Planning		P.O. Box 12428	Austin	TX	78711
State	Mr.	Ray	Newby	Coastal Geologist	Texas General Land Office	Coastal Resources	1700 N. Congress	Austin	TX	78701
Regional	Mr.	Jack	Steele	Executive Director	Houston-Galveston Area Council		P.O. Box 22777	Houston	TX	77227
County	The Hon.	Donald "Dude"	Payne	Commissioner	Brazoria County	Precinct 1	P.O. Box 998	Clute	TX	77531
County	The Hon.	Matt	Sebesta	Commissioner	Brazoria County	Precinct 2	21017 CR 171	Angleton	TX	77515
County	The Hon.	Stacy L.	Adams	Commissioner	Brazoria County	Precinct 3	P.O. Box 548	Alvin	TX	77512
County	The Hon.	Ryan	Dennard	Commissioner	Galveston County	Precinct 1	722 Moody, 1st Floor	Galveston	TX	77550
County	The Hon.	Kevin	O'Brien	Commissioner	Galveston County	Precinct 2	111730 Highway 6	Sante Fe	TX	77510
County	The Hon.	Stephen D.	Holmes	Commissioner	Galveston County	Precinct 3	9850-A Emmett F. Lowry Expressway, Suite A100	Texas City	TX	77591
County	The Hon.	Ken	Clark	Commissioner	Galveston County	Precinct 4	174 Calder Road	League City	TX	77573
County	The Hon.	El Franco	Lee	Commissioner	Harris County	Precinct 1	1001 Preston Avenue, Suite 950	Houston	TX	77002
County	The Hon.	Jack	Morman	Commissioner	Harris County	Precinct 2	16603 Buccaneer	Houston	TX	77062

Houston Spaceport Mailing List for Early Notification Letters Mailed on 10/11/2013

Type	Title	FName	LName	Position	Organization	Dist/Dept/Div	Mailing Address	City	ST	Zip
County	Mr.	Mike	Talbott	Director	Harris County Flood Control District		9900 Northwest Freeway	Houston	TX	77092
County	Dr.	Umair A.	Shah	Executive Director	Harris County Public Health and Environmental Services		2223 West Loop South	Houston	TX	77027
County	Mr.	John R.	Blount	Director	Harris County Public Infrastructure Development	Architecture and Engineering Division	1001 Preston, 7th Floor	Houston	TX	77002
County	The Hon.	Joe	King	County Judge	Brazoria County		111 E. Locust Street, Suite 102	Angleton	TX	77515
County	The Hon.	Ed	Emmett	County Judge	Harris County		1001 Preston, Suite 911	Houston	TX	77002
County	The Hon.	Mark	Henry	County Judge	Galveston County		722 Moody, Suite 200	Galveston	TX	77550
City	The Hon.	Gary	Appelt	Mayor	City of Alvin		216 West Sealy	Alvin	TX	77511
City	The Hon.	Julie	Masters	Mayor	City of Dickinson		4403 Highway 3	Dickinson	TX	77539
City	The Hon.	Kevin M.	Holland	Mayor	City of Friendswood		910 South Friendswood Drive	Friendswood	TX	77546
City	The Hon.	Lewis	Rosen	Mayor	City of Galveston		P.O. Box 779	Galveston	TX	77553
City	The Hon.	Tom	Wilson	Mayor	City of Hillcrest Village		P.O. Box 1172	Alvin	TX	77512
City	The Hon.	Anthony	Matranga	Mayor	City of Hitchcock		7423 Highway 6	Hitchcock	TX	77563
City	The Hon.	Steve	Spicer	Mayor	City of Jamaica Beach		5264 Jamaica Beach	Jamaica Beach	TX	77554
City	The Hon.	Bobby	Hocking	Mayor	City of La Marque		1111 Bayou Road	La Marque	TX	77568
City	The Hon.	Tim	Paulissen	Mayor	City of League City		300 W. Walker	League City	TX	77573
City	The Hon.	Bill	Strickland	Mayor	City of Liverpool		P.O. Box 68	Liverpool	TX	77577
City	The Hon.	Mark	Denman	Mayor	City of Nassau Bay		P.O. Box 58448	Nassau Bay	TX	77258
City	The Hon.	Johnny	Isbell	Mayor	City of Pasadena		1211 Southmore	Pasadena	TX	77502
City	The Hon.	Tom	Reid	Mayor	City of Pearland		3519 Liberty Drive	Pearland	TX	77581
City	The Hon.	Ralph	Stenzel	Mayor	City of Santa Fe		P.O. Box 950	Santa Fe	TX	77510
City	The Hon.	Matthew T.	Doyle	Mayor	City of Texas City		P.O. Box 2608	Texas City	TX	77592
City	The Hon.	Floyd H.	Myers	Mayor	City of Webster		101 Pennsylvania	Webster	TX	77598
Tenant	Mr.	Robert	Amey	Principal	Aerosim Flight Academy		12711 Blume Avenue, Ellington Field	Houston	TX	77034
Tenant	Ms.	Helene	McCorvey	Owner	Flying Tigers		12711 Blume Avenue	Houston	TX	77034
Tenant	Mr.	William E.	King	President	Southwest Airport Services		Ellington Field Building 500, 11811 N. Brantly Road	Houston	TX	77034
Tenant	Mr.	Randall L.	Reed	CEO	Starbase Jet Charter		11210 Blume Avenue	Houston	TX	77034
Tenant	Ms.	Laura	Hays	Director	TrustComm	Defense Solutions	11140 Aerospace Avenue	Houston	TX	77034

**Draft EA Notice of Availability
and Public Meeting
Notification**



Office of Commercial Space Transportation

About the Office

Licenses, Permits & Approvals

Launch Data and Information

Reports & Studies

Regulations

Programs

Legislation & Policies

Commercial Space Transportation Industry

COMSTAC

News & Announcements

Meetings & Events

Publications

Aerospace Careers

Job Openings

Contact Us

FAA Home > Offices > Office of Commercial Space Transportation

Houston Spaceport Draft Environmental Assessment

Print Share

The Federal Aviation Administration (FAA) has prepared a Draft Environmental Assessment (EA) to analyze the potential environmental impacts of the Houston Airport System's (HAS's) proposal to operate a commercial space launch site at Ellington Airport (EFD) in Harris County, Texas and offer the site to commercial launch vehicle operators for the operation of horizontal take-off and horizontal landing reusable launch vehicles (RLVs). To operate a commercial space launch site, HAS must obtain a launch site operator license from the FAA.

Under the Proposed Action, the FAA would (1) issue a launch site operator license to HAS for the operation of a commercial space launch site at EFD, (2) issue launch licenses to commercial launch vehicle operators that would allow them to conduct launches of horizontal take-off and horizontal landing RLVs from EFD, and (3) provide unconditional approval to the Airport Layout Plan modifications that reflect the designation of a spaceport boundary and existing and planned spaceport facilities and infrastructure. Proposed launch operations would begin in 2015 and continue through 2019.

An electronic copy of the Draft EA is now available through the following link: Environmental Assessment (PDF)

A paper copy and electronic version (CD) of the Draft EA may be reviewed for comment during regular business hours at the following libraries:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
• Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
• Alvin Library, 105 South Gordon Street, Alvin, TX 77511
• Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting to solicit comments from the public concerning the scope and content of the Draft EA. Details of the meeting are as follows:

- January 22, 2015, 5:30 p.m. to 8:30 p.m., Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058

The public will be able to speak to project representatives one-on-one and submit

Comments should be as specific as possible and address the analysis of potential environmental impacts and the adequacy of the Proposed Action or merits of alternatives being considered. Reviewers should organize their comments to be meaningful and inform the FAA of their interests and concerns by quoting or providing specific references to the text of the Draft EA. Matters that could have been raised with specificity during the comment period on the Draft EA may not be considered if they are raised for the first time later in the decision process. This commenting procedure is intended to ensure that substantive comments and concerns are made available to the FAA in a timely manner so that the FAA has an opportunity to address them.

Please submit comments in writing to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Ave., SW, Suite 325, Washington, DC 20591, or by email at houstonairportEA@houstontx.gov.

Page last modified: December 30, 2014 1:07:58 PM EST

FAA for...

Pilots
Mechanics
Other Aviation Professionals
Travelers
Educators & Students

Handbooks & Manuals

Aircraft
Aviation
Examiner & Inspector

Forms

FAA Forms
National Airports Forms

Aircraft Certificates

Type Certificate Data Sheets (TCDS)
Supplemental Type Certificates

Aeronautical Navigation Products

Airport Diagrams
Airport/Facility Directory ([d-A/FD](#))
National Flight Data Center ([NFDC](#))
Terminal Procedures ([d-TPP](#))

NextGen Information

NextGen
Performance Snapshots
The NextGen Experience

Offices

Headquarters, Regional, & Field
Flight Standards District Offices ([FSDO](#))

Accidents & Incidents

Accident & Incident Data
Preliminary Accident & Incident Data

Our Safety Culture

FAA Mission
The Foundation of Everything We Do

Regulations & Guidelines

Advisory Circulars (ACs)
Airworthiness Directives (ADs) – Current Only
Airworthiness Directives (ADs) – Historical
Federal Aviation Regulations (FAR)
Orders & Notices
Temporary Flight Restrictions (TFRs)

Other Popular FAA Sites

Airmen Inquiry
Airmen Online Services
FAA Registry Aircraft Inquiry
FAA Safety Team
Flight Delay Information

Stay Connected



Visit **FAA Mobile**



U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
1-866-TELL-FAA (1-866-835-5322)

Readers & Viewers



Web Policies

Government Sites

DOT.gov
USA.gov
Plainlanguage.gov
Recovery.gov

Frequently Asked Questions

All Questions

Contact Us

Contact Us

limited. Additional information regarding this and other IMO SHC public meetings may be found at: www.uscg.mil/imo.

Dated: December 18, 2014.

Marc Zlomek,

Executive Secretary, Shipping Coordinating Committee, Department of State.

[FR Doc. 2014-30711 Filed 12-30-14; 8:45 am]

BILLING CODE 4710-09-P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Office of Commercial Space Transportation; Notice of Availability and Request for Comment on the Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Notice of Availability, Notice of Public Comment Period, Notice of Public Meeting, and Request for Comment.

SUMMARY: In accordance with the National Environmental Policy Act of 1969, as amended (NEPA; 42 United States Code 4321 *et seq.*), Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations parts 1500 to 1508), and FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures*, the FAA is announcing the availability of and requesting comments on the Draft Environmental Assessment for the Houston Spaceport (Draft EA).

FOR FURTHER INFORMATION CONTACT: Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Ave. SW., Suite 325, Washington, DC 20591; phone (202) 267-5924; or email houston-spaceportEA@houston-tx.gov.

SUPPLEMENTARY INFORMATION: The Draft EA was prepared to analyze the potential environmental impacts of Houston Airport System's (HAS's) proposal to establish and operate a commercial space launch site at the Ellington Airport (EFD), in Houston, Texas and offer the site to prospective commercial space launch operators for the operation of horizontal take-off and horizontal landing Concept X and Concept Z reusable launch vehicles (RLVs). To operate a commercial space launch site, HAS must obtain a commercial space launch site operator license from the FAA. Under the Proposed Action addressed in the Draft

EA, the FAA would: (1) Issue a launch site operator license to HAS for the operation of a commercial space launch site at EFD; (2) issue launch licenses to prospective commercial space launch operators that would allow them to conduct launches of horizontal take-off and horizontal landing Concept X and Concept Z RLVs from EFD, and (3) provide unconditional approval to the Airport Layout Plan (ALP) modifications that reflect the designation of a spaceport boundary and construction of planned spaceport facilities and infrastructure. Proposed launch operations would begin in 2015 and continue through 2019 in accordance with the terms of the launch site operator license. HAS proposes to provide RLV operators the ability to conduct up to 50 launches and landings (or 100 operations) per year, with approximately five percent of the operations expected to occur during night-time hours.

The Draft EA addresses the potential environmental impacts of implementing the Proposed Action and the No Action Alternative. Under the No Action Alternative, the FAA would not issue a launch site operator license to HAS, and thus no launch licenses to individual commercial space launch vehicle operators to operate at EFD. Also, there would be no need to update the EFD ALP, and thus there would be no FAA approval of a revised ALP. Existing operations would continue at EFD, which is currently classified as a commercial primary small-hub airport.

The environmental impact categories considered in the Draft EA include air quality; climate; coastal resources; compatible land use; Department of Transportation Act: Section 4(f); fish, wildlife, and plants; floodplains; hazardous materials, pollution prevention, and solid waste; historical, architectural, archaeological, and cultural resources; light emissions and visual impacts; natural resources and energy supply; noise; socioeconomic, environmental justice, and children's environmental health and safety risks; water quality; and wetlands. The Draft EA also considers the potential cumulative environmental impacts.

The FAA has posted the Draft EA on the FAA Office of Commercial Space Transportation Web site: http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/.

A paper copy and electronic version (CD) of the Draft EA may be reviewed for comment during regular business hours at the following libraries:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting to solicit comments from the public concerning the scope and content of the Draft EA. Details of the meeting are as follows:

- January 22, 2015, 5:30 p.m. to 8:30 p.m., Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058

The public will be able to speak to project representatives one-on-one and submit written comments and/or provide oral comments to a stenographer. Oral and written comments are weighted evenly.

DATES: The FAA encourages all interested parties to provide comments concerning the scope and content of the Draft EA. To ensure that all comments can be addressed in the Final EA, comments on the draft must be received by the FAA on or before January 31, 2015, or 30 days from the date of publication of this **Federal Register** (FR) notice, whichever is later.

Comments should be as specific as possible and address the analysis of potential environmental impacts and the adequacy of the Proposed Action or merits of alternatives being considered. Reviewers should organize their comments to be meaningful and inform the FAA of their interests and concerns by quoting or providing specific references to the text of the Draft EA. Matters that could have been raised with specificity during the comment period on the Draft EA may not be considered if they are raised for the first time later in the decision process. This commenting procedure is intended to ensure that substantive comments and concerns are made available to the FAA in a timely manner so that the FAA has an opportunity to address them.

ADDRESSES: Please submit comments in writing to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Ave. SW., Suite 325, Washington, DC 20591, or by email at houston-spaceportEA@houston-tx.gov.

Issued in Washington, DC on December 22, 2014.

Daniel Murray,

Manager, Space Transportation Development Division.

[FR Doc. 2014-30558 Filed 12-30-14; 8:45 am]

BILLING CODE 4310-13-P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Thirtieth Meeting: RTCA Special Committee 224, Airport Security Access Control Systems

AGENCY: Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT).

ACTION: Meeting Notice of RTCA Special Committee 224, Airport Security Access Control Systems.

SUMMARY: The FAA is issuing this notice to advise the public of the thirtieth meeting of the RTCA Special Committee 224, Airport Security Access Control Systems.

DATES: The meeting will be held on January 28th, 2015 from 10:00 a.m.–2:00 p.m.

ADDRESSES: The meeting will be held at RTCA, Inc., 1150 18th Street NW., Suite 910, Washington, DC, 20036.

FOR FURTHER INFORMATION CONTACT: The RTCA Secretariat, 1150 18th Street NW., Suite 910, Washington, DC, 20036, or by telephone at (202) 833-9339, fax at (202) 833-9434, or Web site at <http://www.rtca.org>.

SUPPLEMENTARY INFORMATION: Pursuant to section 10(a) (2) of the Federal Advisory Committee Act (Pub. L. 92-463, 5 U.S.C., App.), notice is hereby given for a meeting of Special Committee 224. The agenda will include the following:

January 28th 2015

- Welcome/Introductions/ Administrative Remarks.
 - Review/Approve Previous Meeting Summary
 - Report from the TSA.
 - Report on Safe Skies Document Distribution
 - Program Management Committee Direction for Consideration of Operational Guidance
 - Revised Terms of Reference— Review/Approval
 - Individual Document Section Reports
 - Action Items for Next Meeting
 - Time and Place of Next Meeting
 - Any Other Business
 - Adjourn
- Attendance is open to the interested public but limited to space availability.

With the approval of the chairman, members of the public may present oral statements at the meeting. Persons wishing to present statements or obtain information should contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section. Members of the public may present a written statement to the committee at any time.

Issued in Washington, DC, on December 22, 2014.

Mohannad Dawoud,

Management Analyst, NextGen, Program Oversight and Administration, Federal Aviation Administration.

[FR Doc. 2014-30548 Filed 12-30-14; 8:45 am]

BILLING CODE 4910-13-P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Sixty-Second Meeting: RTCA Special Committee 186, Automatic Dependent Surveillance-Broadcast (ADS-B)

AGENCY: Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT).

ACTION: Meeting Notice of RTCA Special Committee 186, Automatic Dependent Surveillance-Broadcast (ADS-B).

SUMMARY: The FAA is issuing this notice to advise the public of the sixty second meeting of the RTCA Special Committee 186, Automatic Dependent Surveillance-Broadcast (ADS-B).

DATES: The meeting will be held January 23, 2015 from 9:00 a.m.–5:00 p.m.

ADDRESSES: The meeting will be held at the RTCA Headquarters—NBAA & Colson Conference Rooms, 1150 18th Street NW., Suite 910, Washington, DC 20036

FOR FURTHER INFORMATION CONTACT: The RTCA Secretariat, 1150 18th Street NW., Suite 910, Washington, DC, 20036, or by telephone at (202) 330-0662/(202) 833-9339, fax (202) 833-9434, or Web site at <http://www.rtca.org>.

SUPPLEMENTARY INFORMATION: Pursuant to section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-463, 5 U.S.C., App.), notice is hereby given for a meeting of Special Committee 186. The agenda will include the following:

January 23 2015

- Chairman's Introductory Remarks
- Review of Meeting Agenda
- Review/Approval of the 61st Meeting Summary, RTCA Paper No. RTCA Paper No. 169-14/SC186-335
- Surveillance Broadcast Services (SBS) Program Status
- European Activities

- Updated SC-186 Terms of Reference
- WG-4—Application Technical Requirements
 - Flight Deck-based Interval Management (FIM) MOPS Status & Schedule
 - Cockpit Assisted Pilot Procedures (CAPP)
 - Preliminary look at recent MITRE HITL
- Advanced Interval Management (A-IM) Development
- Coordination with SC-214/WG-78 for ADS-B Application Data Link Rqts-Status
- FAA information briefings
 - Equip 2020
 - Planned TIS-B Service Changes
 - Recent Regulatory/Guidance/Policy updates
 - Summary of Avionics Monitoring results
- Date, Place and Time of Next Meeting
- New Business
 - Overview of 1090 MHz Phase Modulation Research
- Other Business.
 - Status brief on Wake Vortex Tiger Team
- Review Action Items/Work Programs
- Adjourn Plenary

Attendance is open to the interested public but limited to space availability. With the approval of the chairman, members of the public may present oral statements at the meeting.

Persons wishing to present statements or obtain information should contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section. Members of the public may present a written statement to the committee at any time.

Issued in Washington, DC on December 22, 2014.

Mohannad Dawoud,

Management Analyst, Program Oversight and Administration, NextGen, Management Services, Federal Aviation Administration.

[FR Doc. 2014-30551 Filed 12-30-14; 8:45 am]

BILLING CODE 4910-13-P

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

[Docket No. FHWA-2014-0040]

Agency Information Collection Activities: Notice of Request for Reinstatement of a Previously Approved Information Collection

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of request for extension of currently approved information collection.

SUMMARY: In compliance with the Paperwork Reduction Act (PRA) of 1995



FEDERAL AVIATION ADMINISTRATION DRAFT EA NOTICE OF AVAILABILITY and OPEN HOUSE PUBLIC MEETING

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA), Office of Commercial Space Transportation is announcing the availability of the *Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas* (Draft EA). The Draft EA evaluates potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to the commercial space industry for the operation of horizontal take-off and horizontal landing reusable launch vehicles. To operate a commercial space launch site, the Houston Airport System must obtain a launch site operator license from the FAA. The Draft EA can be reviewed online at:

http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/

In addition, a printed copy of the Draft EA is available at the following locations:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting on January 22, 2015, from 5:30 p.m. to 8:30 p.m. at the Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058. The public will be able to speak to project representatives one-on-one and submit written comments or provide oral comments to a stenographer. Comments or questions on the Draft EA should be sent on or before January 31, 2015 (or within 30 days of the Federal Register notice; whichever is later) and may be addressed to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Avenue, SW, Suite 325, Washington, DC 20591 or submitted by email to: houston-spaceportEA@houston-tx.gov

Houston Spaceport Draft Environmental Assessment Distribution List

The following names and addresses in yellow highlight were sent the FAA general distribution letter, one (1) hardcopy of the Houston Spaceport Draft EA, and one (1) CD of the Draft EA. Contacts without highlighting were sent a flyer of the Draft EA NOA newspaper announcement (which includes a web link to review the Draft EA).

HAS

Arturo Machuca
Houston Airport System
16930 John F Kenney Blvd
Houston, TX 77032
713-859-4221

(3 hardcopies, 3 CDs – 1 for the public's review at EFD)

Federal

Mr. Daniel Czelusniak
Federal Aviation Administration
800 Independence Avenue, SW, Suite 325
Washington, DC 20591
202-267-5924

Ms. Stacey Zee
Federal Aviation Administration
801 Independence Avenue, SW, Suite 325
Washington, DC 20592

Mr. Ken Gidlow
FAA – AST
15927 El Camino Real
Houston, Texas 77062
281-483-9931

Mr. Kelvin Solco
Federal Aviation Administration
2601 Meacham Boulevard
Fort Worth, TX 73137

Mr. Cameron Bryan
Federal Aviation Administration
2601 Meacham Boulevard, Room 610
Fort Worth, TX 73138

Mr. Dean McMath
Federal Aviation Administration
2601 Meacham Boulevard, Room 697
Fort Worth, TX 73137
817-222-5617

Mr. Tony Robinson
Federal Emergency Management Agency
FRC 800 North Loop 288
Denton, TX 76209

Dr. Ellen Ochoa
NASA
2101 NASA Parkway
Houston, TX 77058

Ms. Tina Norwood
National Aeronautics and Space
Administration
300 E Street SW, Suite 5B11
Washington, DC 20546
202-358-7324

Mr. Al Alonzi
Federal Highway Administration – Texas
Division
300 E. 8th Street, Room 826
Austin, TX 78701

Dr. James Nance
National Oceanic and Atmospheric
Administration
4700 Avenue U
Galveston, TX 77551

Mr. Salvador Salinas
Natural Resources Conservation Services
101 South Main Street
Temple, TX 76501

Col. Richard P. Pannell
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553

Mr. Dan Deerinwater
U.S. Bureau of Indian Affairs
P.O. Box 368
Anadarko, OK 73005

Ms. Melanie Barnes
U.S. Bureau of Land Management
P.O. Box 27115
Santa Fe, NM 87502

Mr. Mark Trevino
U.S. Bureau of Reclamation
5316 Highway 290 West, Suite 110
Austin, TX 78735

MST2 Chris Bennett
U.S. Coast Guard
9640 Clinton Drive
Houston, TX 77029
713-571-5199

CDR Scott E. Langum
U.S. Coast Guard Air Station Houston
1178 Ellington Field
Houston, TX 77034

Ms. Barbara R. Britton
U.S. Department of Housing and Urban
Development
801 Cherry Street, Room 2862
Fort Worth, TX 76102

Mr. Stephen Spencer
U.S. Department of Interior
1001 Indian School Road, NW, Suite 348
Albuquerque, NM 87104

Mr. Mark Briggs
U.S. Department of Labor
17625 El Camino Real, Suite 400
Houston, TX 77058

Ms. Rhonda Smith
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202
214-665-8006

Ms. Edith Erfling
U.S. Fish and Wildlife Service
17629 El Camino Real, #211
Houston, TX 77058
281-286-8282

Ken Aney (acting regional forester)
U.S. Forest Service
1720 Peachtree Road NW
Atlanta, GA 30309

Ms. Marjorie McColl Petty
U.S. Health and Human Services
1301 Young Street, Suite 1124
Dallas, TX 75202

Ms. Sue Masica
U.S. National Park Service
12795 Alameda Parkway
Denver, CO 80225
303-969-2500

The Hon. Randy Weber
U.S. House of Representatives
174 Calder Road
League City, TX 77573

The Hon. Pete Olson
U.S. House of Representatives
6302 W. Broadway Street, Suite 220
Pearland, TX 77581

The Hon. Gene Green
U.S. House of Representatives
11811 I-10 East, Suite 430
Houston, TX 77029

The Hon. Steve Stockman
U.S. House of Representatives
8060 Spencer Highway, San Jacinto
College, Building 1, Room 108
Pasadena, TX 77505

The Hon. John Cornyn
U.S. Senate
5300 Memorial Drive, Suite 980
Houston, TX 77007

The Hon. Ted Cruz
U.S. Senate
808 Travis Street, Suite 1420
Houston, TX 77002

Col. John B. "Jack" Daniel
Texas Air National Guard
147th Reconnaissance Wing
Ellington Airport
14657 Sneider
Houston, TX 77034
281-929-2662

State

Mr. Milton Rister
Railroad Commission of Texas
P.O. Box 12967
Austin, TX 78711

Ms. Ashley K. Wadick
Regional Director
Texas Commission on Environmental
Quality, Region 12
5425 Polk Street, Suite H
Houston, TX 77023
713-767-3500

Mr. David Brymer
Director, Air Quality Division
Texas Commission on Environmental
Quality
P.O. Box 13087, MC 206
Austin, TX 78711

Ms. Kellye Rila
Director, Water Division
Texas Commission on Environmental
Quality
P.O. Box 13087, MC 160
Austin, TX 78711

Ms. Rebecca Villalba,
Texas Commission on Environmental
Quality
12100 Park 35 Circle
Austin, TX 78753

Ms. Jennifer Bailey
Wastewater/Stormwater
Texas Department of Agriculture
5425 Polk Street, Suite G-20
Houston, TX 77023

Dr. Paul K. McGaha
Texas Department of State Health
Services
5425 Polk, Suite J, MC 1906
Houston, TX 77023

Mr. David Fulton
Aviation Director
Texas Department of Transportation
125 E. 11th St.
Austin, TX 78701
512-416-4502

Mr. Michael W. Alford
District Engineer
Texas Department of Transportation
P.O. Box 1386
Houston, TX 77251

Mr. Michael L. Williams
Texas Education Agency
1701 N. Congress Avenue
Austin, TX 78701

Ms. Helen Young
Deputy Commissioner Coastal Resources
Texas General Land Office
P.O. Box 12873
Austin, TX 78711

Mr. Jeffrey Davis
Texas General Land Office
11811 North D Street
La Porte, TX 77571

Ray Newby
Coastal Geologist
Coastal Resources
Texas General Land Office
1700 N. Congress
Austin, Texas 78701
512-475-3624

Ms. Tara Ellis Mealy
Natural Resources
Texas General Land Office
11811 North D Street
La Porte, TX 77571

Ms. Linda Henderson
Texas Historical Commission
1511 Colorado St.
Austin, TX 78701
512-463-5851

Mr. Mark Wolfe
Executive Director and SHPO
Texas Historical Commission
1511 Colorado St.
Austin, TX 78701
Austin, TX 78711

Ms. Amy Turner
Texas Parks and Wildlife Department
1502 FM 517 East
Dickinson, TX 77539
512-389-4800

The Hon. Rick Perry
State of Texas
P.O. Box 12428
Austin, TX 78711

The Hon. Craig Eiland
Texas House of Representatives
9702 E.F. Lowery Expressway
Texas City, TX 77591

The Hon. Greg Bonnen
Texas House of Representatives
174 Calder Road, Suite 116
League City, TX 77573

The Hon. Dennis Bonnen
Texas House of Representatives
122 E. Myrtle
Angleton, TX 77515

The Hon. Ed Thompson
Texas House of Representatives
P.O. Box 2910
Austin, TX 78768

The Hon. Wayne Smith
Texas House of Representatives
909 Decker Drive, Suite 104
Baytown, TX 77520

The Hon. John E. Davis
Texas House of Representatives
1350 NASA Parkway, #212
Houston, TX 77058

The Hon. Alma A. Allen
Texas House of Representatives
10101 Fondren Road, Suite 500
Houston, TX 77096

The Hon. Carol Alvarado
Texas House of Representatives
2900 Woodridge Drive, Suite 305
Houston, TX 77087

The Hon. Garnet F. Coleman
Texas House of Representatives
5445 Almeda, Suite 501
Houston, TX 77004

The Hon. Sylvia R. Garcia
Texas State Senate
5425 Polk Street, Suite 125
Houston, TX 77023

The Hon. Larry Taylor
Texas State Senate
174 Calder Road, Suite 151
League City, TX 77573

Mr. Denise S. Francis
Governor's Office of Budget and Planning
P.O. Box 12428
Austin, TX 78711

Regional

Mr. Jack Steele
Houston-Galveston Area Council
3555 Timmons, Suite 120
Houston, TX 77027
713-627-3200

Counties

The Hon. Donald "Dude" Payne
Brazoria County
P.O. Box 998
Clute, TX 77531

The Hon. Matt Sebesta
Brazoria County
21017 CR 171
Angleton, TX 77515
The Hon. Stacy L. Adams
Brazoria County
P.O. Box 548
Alvin, TX 77512

The Hon. Ryan Dennard
Galveston County
722 Moody, 1st Floor
Galveston, TX 77550

The Hon. Kevin O'Brien
Galveston County
111730 Highway 6
Sante Fe, TX 77510

The Hon. Stephen D. Holmes
Galveston County
9850-A Emmett F. Lowry Expressway,
Suite A100
Texas City, TX 77591

The Hon. Ken Clark
Galveston County
174 Calder Road
League City, TX 77573

The Hon. El Franco Lee
Harris County
1001 Preston Avenue, Suite 950
Houston, TX 77002

The Hon. Jack Morman
Harris County
16603 Buccaneer
Houston, TX 77062

Mr. Josh Stuckey
Harris County Public Infrastructure
Department
10555 Northwest Freeway, Suite 120
Houston, TX 77092

Mr. Mike Talbott
Harris County Flood Control District
9900 Northwest Freeway
Houston, TX 77092

Dr. Umair A. Shah
Harris County Public Health and
Environmental Services
2223 West Loop South
Houston, TX 77027
713-439-6000

Mr. John R. Blount, P.E.
Director Architecture and Engineering
Harris County Public Infrastructure
Development
1001 Preston, 7th Floor
Houston, TX 77002
713-755-6888

The Hon. Joe King
Brazoria County
111 E. Locust Street, Suite 102
Angleton, TX 77515

The Hon. Ed Emmett
Harris County
1001 Preston, Suite 911
Houston, TX 77002

The Hon. Mark Henry
Galveston County
722 Moody, Suite 200
Galveston, TX 77550

Cities

Mayor Annise Parker
City of Houston
P.O. Box 1562
Houston, TX 77251

The Hon. Paul Horn
City of Alvin
216 West Sealy
Alvin, TX 77511

The Hon. Julie Masters
City of Dickinson
4403 Highway 3
Dickinson, TX 77539

The Hon. Kevin M. Holland
City of Friendswood
910 South Friendswood Drive
Friendswood, TX 77546

The Hon. Jim Yarbrough
City of Galveston
P.O. Box 779
Galveston, TX 77553

The Hon. Tom Wilson
City of Hillcrest Village
P.O. Box 1172
Alvin, TX 77512

The Hon. Anthony Matranga
City of Hitchcock
7423 Highway 6
Hitchcock, TX 77563

The Hon. Steve Spicer
City of Jamaica Beach
5264 Jamaica Beach
Jamaica Beach, TX 77554

The Hon. Bobby Hocking
City of La Marque
1111 Bayou Road
La Marque, TX 77568

The Hon. Tim Paulissen
City of League City
300 W. Walker
League City, TX 77573

The Hon. Bill Strickland
City of Liverpool
P.O. Box 68
Liverpool, TX 77577

The Hon. Mark Denman
City of Nassau Bay
1800 Space Park Drive, Suite 200
Nassau Bay, TX 77058

The Hon. Johnny Isbell
City of Pasadena
1211 Southmore
Pasadena, TX 77502

The Hon. Tom Reid
City of Pearland
3519 Liberty Drive
Pearland, TX 77581

The Hon. Ralph Stenzel
City of Santa Fe
P.O. Box 950
Santa Fe, TX 77510

The Hon. Matthew T. Doyle
City of Texas City
P.O. Box 2608
Texas City, TX 77592

The Hon. Donna Rogers
City of Webster
101 Pennsylvania
Webster, TX 77598

EFD Tenants

Ms. Helene McCorvey
Flying Tigers
12711 Blume Avenue
Houston, TX 77034

Mr. William E. King
Southwest Airport Services
Ellington Field Building 500, 11811 N.
Brantly Road
Houston, TX 77034

Mr. Randall L. Reed
Starbase Jet Charter
11210 Blume Avenue
Houston, TX 77034

Ms. Laura Hays
TrustComm
11140 Aerospace Avenue
Houston, TX 7703

Libraries

Clear Lake City-County Freeman Branch
Library
16616 Diana Lane
Houston, TX 77062
281-488-1906

Friendswood Public Library
416 South Friendswood Drive
Friendswood, TX 77546
281-482-7135

Alvin Library
105 South Gordon Street
Alvin, TX 77511
281-388-4300

Hitchcock Public Library
8005 Barry Avenue
Hitchcock, TX 77563
409-986-7814

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS:

COUNTY OF HARRIS:

Before me, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared, the Newspaper Representative at the HOUSTON CHRONICLE, a daily newspaper published in Harris County, Texas, and generally circulated in the Counties of: HARRIS, TRINITY, WALKER, GRIMES, POLK, SAN JACINTO, WASHINGTON, MONTGOMERY, LIBERTY, AUSTIN, WALLER, CHAMBERS, COLORADO, BRAZORIA, FORT BEND, GALVESTON, WHARTON, JACKSON, and MATAGORDA and that the publication, of which the annexed herein, or attached to, is a true and correct copy, was published to-wit:

COMMUNITY AWARENESS SERVICES	26190397	16553714	
RAN A LEGAL NOTICE			
SIZE BEING: 1 X 96 L			
product	date	class	page
hc	Jan 7 2015	1245.0	D_wedlg_5

Pat Dackett

NEWSPAPER REPRESENTATIVE

Sworn and subscribed to before me, this the 7th Day of January A.D. 2015



Charles E. Waluchowski

Notary Public in and for the State of Texas

**FEDERAL AVIATION
ADMINISTRATION
DRAFT EA NOTICE
OF AVAILABILITY
and OPEN HOUSE
PUBLIC MEETING**

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA), Office of Commercial Space Transportation is announcing the availability of the *Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas* (Draft EA). The Draft EA evaluates potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to the commercial space industry for the operation of horizontal take-off and horizontal landing reusable launch vehicles. To operate a commercial space launch site, the Houston Airport System must obtain a launch site operator license from the FAA. The Draft EA can be reviewed online at:

<http://www.faa.gov/about/office-org/headquarters-offices/ast/environmental/nepa-docs/review/documents-progress/>

In addition, a printed copy of the Draft EA is available at the following locations:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX, 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX, 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX, 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX, 77563

The FAA will hold an open house public meeting on January 22, 2015, from 5:30 p.m. to 8:30 p.m. at the Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058. The public will be able to speak to project representatives one-on-one and submit written comments or provide oral comments to a stenographer. Comments or questions on the Draft EA should be sent on or before January 31, 2015 (or within 30 days of the Federal Register notice; whichever is later) and may be addressed to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Avenue, SW, Suite 325, Washington, DC 20591 or submitted by email to houston-spaceportEA@houston-tx.gov



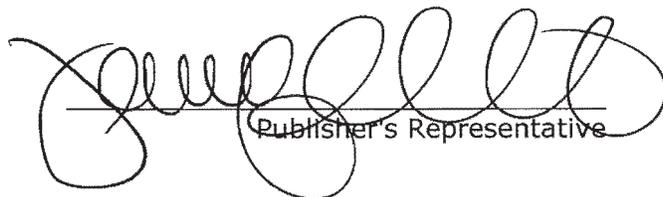
HOUSTON COMMUNITY NEWSPAPERS

AFFIDAVIT OF PUBLICATION

**STATE OF TEXAS
COUNTY OF HARRIS**

Personally appeared before the undersigned, a Notary Public within and for said County and State. Jennifer Underferth, Representative for Jason Joseph, General Manager and Publisher of the Bay Area Citizen, a newspaper of general circulation in the County of Harris/Galveston, State of Texas. Who being duly sworn, states under oath that the report of Legal Notices, a true copy of which is hereto annexed was published in said newspaper in its issue(s) of the

8th day of January, 2015
____ day of _____, 2015
____ day of _____, 2015
____ day of _____, 2015



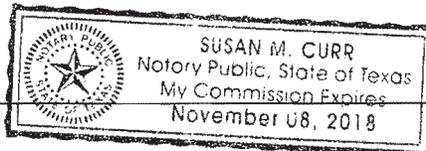
Publisher's Representative

Sworn to and subscribed before me this 8 day of January, 2015.



Notary Public

My commission expires on (stamp) _____





CHANGING LIVES
ONE AUTO LOAN AT A TIME



\$100
CASH BACK

EVERY AUTO LOAN

AUTO RATES
AS LOW AS
.99% - 12.50% APR

UP TO 60 MONTHS

ASK ABOUT
90 DAYS
DEFERRED

AUTO PAYMENTS

Apply Online! www.ShellFCU.org Federally insured by the NCUA. 

Shell FCU is federally insured by the National Credit Union Administration (NCUA) and is an Equal Opportunity Lender. Anyone who lives, works, worships or attends school in Harris County, TX can do business with Shell FCU once a \$5 savings account is established for membership. Your rate will be determined by credit score and qualifying Shell FCU loan criteria applies for all loans. APR denotes Annual Percentage Rate. Rates advertised are based on Protection Package discount as of 10/1/14. Lowest rate of .99% Annual Percentage Rate APR for up to 60 months is \$17.09 per thousand and highest rate of 12.50% APR for up to 60 months is \$22.50 per thousand. Existing Shell FCU loans not eligible for refinance. Special loans such as indirect loans closed at dealerships, title, restructured, credit builder and boost loans are not eligible for special offers. To qualify for 90 Days Deferred Auto Payments, you must have a credit score of 600 or higher, be in good standing with Shell FCU and close your loan at a Shell FCU branch. Interest will continue to accrue each month during deferment. \$100 CASH BACK for every auto loan will be deposited into member's primary savings within 48 hours after closing and only applies to loans closed at a Shell FCU branch. Applicable 1099 forms will be issued in January 2015. This offer cannot be combined with any other offer and Shell FCU reserves the right to discontinue promotions without notice at any time for any reason. For full details visit www.SFCUChangingLives.com.



FEDERAL AVIATION ADMINISTRATION
DRAFT EA NOTICE OF AVAILABILITY
and OPEN HOUSE PUBLIC MEETING

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA), Office of Commercial Space Transportation is announcing the availability of the *Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas* (Draft EA). The Draft EA evaluates potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to the commercial space industry for the operation of horizontal take-off and horizontal landing reusable launch vehicles. To operate a commercial space launch site, the Houston Airport System must obtain a launch site operator license from the FAA. The Draft EA can be reviewed online at: http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/

In addition, a printed copy of the Draft EA is available at the following locations:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting on January 22, 2015, from 5:30 p.m. to 8:30 p.m. at the Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058. The public will be able to speak to project representatives one-on-one and submit written comments or provide oral comments to a stenographer. Comments or questions on the Draft EA should be sent on or before January 31, 2015 (or within 30 days of the Federal Register notice; whichever is later) and may be addressed to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Avenue, SW, Suite 325, Washington, DC 20591 or submitted by email to houstonpaceportEA@houstontx.gov

All Premiere
Theatres Are
100%
Digital

PREMIERE CINEMAS

www.pccmovies.com

NASA PREMIERE 8
281-332-4403 • 20833 Gulf Freeway, Webster TX 77598

<p>GUARDIANS OF THE GALAXY (PG13) Runtime: 131 minutes 2D: 12:50 pm ' 9:30 pm</p> <p>THE BOOK OF LIFE (PG) Runtime: 106 minutes 3D: 1:20 pm ' 4:10 pm 2D: 1:05 pm ' 3:45 pm ' 6:35 pm ' 9:20 pm</p>	<p>FURY (R) Runtime: 144 minutes DIGITAL: 12:30 pm ' 3:30 pm ' 6:45 pm ' 9:45 pm</p> <p>GONE GIRL (R) Runtime: 159 minutes DIGITAL: 1:00 pm ' 4:20 pm ' 7:45 pm</p> <p>IRON WICK (R)</p>
---	---

PEARLAND 6
281-997-2828 • 5050 W. Broadway

ANNIE (PG)
RUNTIME: 119 MINUTES
**DIGITAL: 10:20 AM ' 1:20 PM ' 4:20 PM ' 7:20 PM ' 10:15 PM

NIGHT AT THE MUSEUM: SECR (PG)
RUNTIME: 07 MINUTES



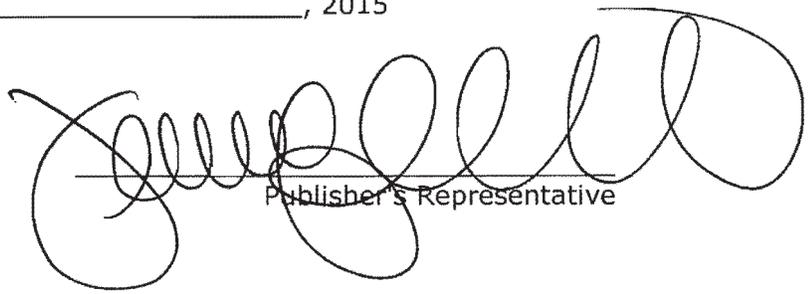
HOUSTON COMMUNITY NEWSPAPERS

AFFIDAVIT OF PUBLICATION

**STATE OF TEXAS
COUNTY OF BRAZORIA**

Personally appeared before the undersigned, a Notary Public within and for said County and State. Jennifer Underferth, Representative for Jason Joseph, General Manager and Publisher of the Pearland/Friendswood Journal, a newspaper of general circulation in the County of Brazoria, State of Texas. Who being duly sworn, states under oath that the report of Legal Notices, a true copy of which is hereto annexed was published in said newspapers in its issue(s) of the

8th day of January, 2015
____ day of _____, 2015
____ day of _____, 2015
____ day of _____, 2015



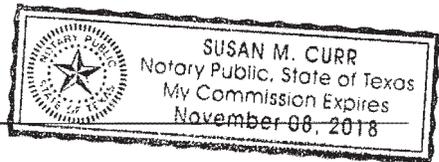
Publisher's Representative

Sworn to and subscribed before me this 8 day of January, 2015.

Susan M. Curr

Notary Public

My commission expires on (stamp) _____



CHANGING LIVES
ONE AUTO LOAN AT A TIME

Shell Federal CREDIT UNION

\$100 CASH BACK
EVERY AUTO LOAN

AUTO RATES AS LOW AS .99% - 12.50% APR
UP TO 60 MONTHS

ASK ABOUT 90 DAYS DEFERRED
AUTO PAYMENTS

Apply Online! www.ShellFCU.org Federally insured by the NCUA.

Shell FCU is federally insured by the National Credit Union Administration (NCUA) and is an Equal Opportunity Lender. Anyone who lives, works, worships or attends school in Harris County, TX can do business with Shell FCU once a \$5 savings account is established for membership. Your rate will be determined by credit score and qualifying Shell FCU loan criteria applies for all loans. APR denotes Annual Percentage Rate. Rates advertised are based on Protection Package discount as of 10/1/14. Lowest rate of .99% Annual Percentage Rate APR for up to 60 months is \$17.09 per thousand and highest rate of 12.50% APR for up to 60 months is \$22.50 per thousand. Existing Shell FCU loans not eligible for refinance. Special loans such as indirect loans closed at dealerships, title, restructured, credit builder and boost loans are not eligible for special offers. To qualify for 90 Days Deferred Auto Payments, you must have a credit score of 600 or higher, be in good standing with Shell FCU and close your loan at a Shell FCU branch. Interest will continue to accrue each month during deferment. \$100 CASH BACK for every auto loan will be deposited into member's primary savings within 48 hours after closing and only applies to loans closed at a Shell FCU branch. Applicable 1099 forms will be issued in January 2015. This offer cannot be combined with any other offer and Shell FCU reserves the right to discontinue promotions without notice at any time for any reason. For full details visit www.SFCUChangingLives.com.



**FEDERAL AVIATION ADMINISTRATION
DRAFT EA NOTICE OF AVAILABILITY
and OPEN HOUSE PUBLIC MEETING**

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA), Office of Commercial Space Transportation is announcing the availability of the *Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas* (Draft EA). The Draft EA evaluates potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to the commercial space industry for the operation of horizontal take-off and horizontal landing reusable launch vehicles. To operate a commercial space launch site, the Houston Airport System must obtain a launch site operator license from the FAA. The Draft EA can be reviewed online at: http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/

In addition, a printed copy of the Draft EA is available at the following locations:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting on January 22, 2015, from 5:30 p.m. to 8:30 p.m. at the Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058. The public will be able to speak to project representatives one-on-one and submit written comments or provide oral comments to a stenographer. Comments or questions on the Draft EA should be sent on or before January 31, 2015 (or within 30 days of the Federal Register notice; whichever is later) and may be addressed to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Avenue, SW, Suite 325, Washington, DC 20591 or submitted by email to houstonpaceportEA@houstontx.gov

All Premiere Theatres Are **100% Digital**

PREMIERE CINEMAS

www.pccmovies.com

NASA PREMIERE 8
281-332-4403 • 20833 Gulf Freeway, Webster TX 77598

PEARLAND 6
281-997-2828 • 5050 W. Broadway

GUARDIANS OF THE GALAXY (PG13)
Runtime: 131 minutes
2D: 12:50 pm ' 9:30 pm

THE BOOK OF LIFE (PG)
Runtime: 106 minutes
3D: 1:20 pm ' 4:10 pm
2D: 1:05 pm ' 3:45 pm ' 6:35 pm ' 9:20 pm

FURY (R)
Runtime: 144 minutes
DIGITAL: 12:30 pm ' 3:30 pm ' 6:45 pm ' 9:45 pm

GONE GIRL (R)
Runtime: 159 minutes
DIGITAL: 1:00 pm ' 4:20 pm ' 7:45 pm

IRON WICK (R)

ANNIE (PG)
RUNTIME: 119 MINUTES
**DIGITAL: 10:20 AM ' 1:20 PM ' 4:20 PM ' 7:20 PM ' 10:15 PM

NIGHT AT THE MUSEUM: SECR (PG)
RUNTIME: 07 MINUTES



**HOUSTON
COMMUNITY
NEWSPAPERS**

AFFIDAVIT OF PUBLICATION

**STATE OF TEXAS
COUNTY OF HARRIS**

Personally appeared before the undersigned, a Notary Public within and for said County and State. Jennifer Underferth, Representative for Jason Joseph, General Manager and Publisher of the Pasadena Citizen, a newspaper of general circulation in the County of Harris, State of Texas. Who being duly sworn, states under oath that the report of Legal Notices, a true copy of which is hereto annexed was published in said newspaper in its issue(s) of the

_____ 8th day of January, 2015
_____ day of _____, 2015
_____ day of _____, 2015
_____ day of _____, 2015

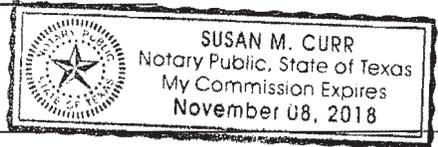


Publisher's Representative

Sworn to and subscribed before me this 8 day of January, 2015.



Notary Public



My commission expires on (stamp) _____



**FEDERAL AVIATION ADMINISTRATION
DRAFT EA NOTICE OF AVAILABILITY
and OPEN HOUSE PUBLIC MEETING**

In accordance with the National Environmental Policy Act, the Federal Aviation Administration (FAA), Office of Commercial Space Transportation is announcing the availability of the *Draft Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas* (Draft EA). The Draft EA evaluates potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to the commercial space industry for the operation of horizontal take-off and horizontal landing reusable launch vehicles. To operate a commercial space launch site, the Houston Airport System must obtain a launch site operator license from the FAA. The Draft EA can be reviewed online at: http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/

In addition, a printed copy of the Draft EA is available at the following locations:

- Clear Lake City-County Freeman Branch Library, 16616 Diana Lane, Houston, TX 77062
- Friendswood Public Library, 416 South Friendswood Drive, Friendswood, TX 77546
- Alvin Library, 105 South Gordon Street, Alvin, TX 77511
- Hitchcock Public Library, 8005 Barry Avenue, Hitchcock, TX 77563

The FAA will hold an open house public meeting on January 22, 2015, from 5:30 p.m. to 8:30 p.m. at the Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058. The public will be able to speak to project representatives one-on-one and submit written comments or provide oral comments to a stenographer. Comments or questions on the Draft EA should be sent on or before January 31, 2015 (or within 30 days of the Federal Register notice; whichever is later) and may be addressed to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Avenue, SW, Suite 325, Washington, DC 20591 or submitted by email to houston-spaceportEA@houston-tx.gov



Offering Real Hope for Real People
*Introducing Wednesday night worship.
Every Wednesday at 7:00 PM
Informal worship and prayer service.
(This service is shift worker friendly.)*

Hope Community United Methodist Church welcomes you for worship

Saturdays at 5:30 PM
Step one: Powerlessness

Sundays at 11:00 AM
Where we were, where we are and where we are going?

You are invited to join us as we Offer Real Hope FOR Real People.

Saturday Evening Worship is an opportunity to combine the 12 steps of recovery with biblical teaching and relates to recovery from addiction, depression, grief and loss.

Jack Womack - Pastor

pastor@hopecommunityumc.org

**Hope Community United
Methodist Church**

**Childcare
At All
Services**

**Open
AA Meeting
4:15 pm every
Saturday**

2838 Lily • Pasadena, TX 77503
281-487-0610

1 Block North of Spencer Hwy, 4 Blocks West of Beltway 8

- HAS Headlines
- Newsletters »
- Media Kit
- Press Releases
- Traffic and Statistics
- Multimedia
- Important Notices
- Archives

Houston Spaceport Draft Environmental Assessment and Public Hearing

The Houston Airport System (HAS) has a vision to support commercial spaceport operations for horizontally launched Reusable Launch Vehicles (RLVs) from Ellington Airport (EFD). HAS envisions that EFD could be a focal point for aerospace innovation – a regional center for a cluster of aerospace entities acting as incubators for aerospace innovation and growth.

Key Spaceport activities could include:

- Component and composite development and fabrication
- Space vehicle assembly
- Zero-gravity scientific and medical experiments
- Microsatellite launches
- Astronaut training and development
- Space tourism



Before Houston Spaceport can become established at Ellington Airport, the Houston Airport System must first be granted a Launch Site License from the Federal Aviation Administration (FAA). HAS is now working closely with the FAA's Office of Commercial Space Transportation to complete the Environmental Assessment.

The draft Environmental Assessment is now available on the FAA's website here http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/houston_spaceport_ea or by clicking [here](#).

The FAA encourages all interested parties to provide comments concerning the scope and content of the Draft Environmental Assessment. To ensure that all comments can be addressed in the Final Environmental Assessment, comments on the draft must be received by the FAA on or before January 31, 2015, or 30 days from the date of publication of the Federal Register (FR) notice, whichever is later.

Please submit comments in writing to Mr. Daniel Czelusniak, Office of Commercial Space Transportation, Federal Aviation Administration, 800 Independence Ave., SW, Suite 325, Washington, DC 20591, or by email at houston-spaceportEA@houstontx.gov.

HAS will hold a public hearing on January 22, 2015. Details of the meeting are as follows:

January 22, 2015, 5:30 p.m. to 8:30 p.m., Space Center Houston, Silvermoon Conference Room (1st floor), 1601 NASA Parkway, Houston, TX 77058

Open House Public Meeting

Open House Public Meeting Space Center Houston, Silvermoon Conference Room January 22, 2015 from 5:30 p.m. to 8:30 p.m.





WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
[REDACTED]	[REDACTED]	✓		NASA

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
		✓		
		✓		
		✓		
			x	KPRC
			x	Ricardo's Assoc
			x	AFLCM

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
		✓		Congressman BRIAN BABIN
		✓		
		✓		FAA AOPA Public
			✓	
		✓		
		✓		

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position	
		Yes	No		
		✓			
			✓		HCRP Pet 718 Precinct Chairman
				✓	
				✓	
			✓		ex-NASA
			✓		RETIRED NASA

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
			✓	
			✓	
			✓	
			✓	
			✓	
			✓	
			✓	
			✓	

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position	
		Yes	No		
		✓	✗	NASA JSC ENVOY Chief	
			x	HAS	
				x	
			✓		
			net	x	Commissioner El Franco Lee Harris County Precinct One
			com		Legislative Affairs Chain League City Chamber

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
		✓		
		✓		
		✓		Middlebrook Community Association
		✓		
			✓	
				Houston City Council Member District E
			✓	

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
		✓		
		✓		
		✓		
		✓		
				
			✓	

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position	
		Yes	No		
		✓			
			✓		
			✓		
			✓		
			✓		

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
		✓ com		
		✓		<ul style="list-style-type: none"> - Northfork Board - Association of CLEARLAKE COMMUNITIES - HOUSTON CITY COUNCIL MICHAEL KUBOSH STAFF
		✓		
		✓		
		✓		
		✓		Harris Co Atty's Office Staff

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



WELCOME TO THE FAA PUBLIC MEETING FOR THE HOUSTON SPACEPORT DRAFT ENVIRONMENTAL ASSESSMENT PLEASE SIGN IN

Location: Space Center Houston
Date: January 22, 2015 (5:30 pm – 8:30 pm)

Name (Please Print)	EMAIL or Mailing Address	Do You Want to be Contacted?		Elected Official or Organization? Please state position
		Yes	No	
[REDACTED]	[REDACTED]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Councilman Corbello

Individual information will not be shared and individuals will not be contacted by the FAA for anything but this project. Individuals will be contacted primarily via regular mail for notice of the availability of public meetings, Final EA, and FAA Decision.



Welcome to the Houston Spaceport Draft Environmental Assessment (EA) Public Meeting



Federal Aviation
Administration

**Draft Environmental Assessment for the
Houston Spaceport, City of Houston,
Harris County, Texas**

December 2014



- The meeting structure is an open-house format. Formal presentations will not occur.
- Exhibit boards summarize the Draft EA analyses.
- Representatives are here to listen to your input.
- Participants are encouraged to provide comments.



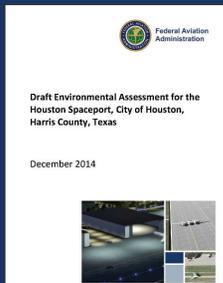
FAA'S ROLE

Launch Site Operator License

- The Airport Sponsor (i.e., Houston Airport System (HAS)) is proposing to establish a commercial space launch site at Ellington Airport – referred to as the Houston Spaceport.
- The HAS must apply to the FAA for a Launch Site Operator License
- FAA statutory requirements for licenses are described in 14 CFR Chapter III, Parts 400-450.
- FAA conducts a review of the license application including a policy review, launch site location review, safety review, and environmental review.
- Successful completion of the environmental review does not guarantee that the FAA would issue a Launch Site Operator License to the HAS.
- Individual launch vehicle operators would need to apply for and obtain separate launch licenses from the FAA before operating at Houston Spaceport.
- A licensee can renew its license by submitting an application to the FAA.

Airport Layout Plan

- An Airport Layout Plan (ALP) is an FAA-approved plan that depicts both existing facilities and planned development for an airport.
- Under the HAS Proposal, the Ellington Airport ALP would need to be modified to reflect the Spaceport.
- Pursuant to 49 U.S.C. §47107(a)(16), the FAA must approve any revision or modification to an ALP before the revision or modification takes effect.
- The FAA's approval reflects a determination that the proposed alterations to the airport, reflected in the ALP revision or modification, do not adversely affect the safety, utility, or efficiency of the airport.





PROPOSED ACTION AND ALTERNATIVES

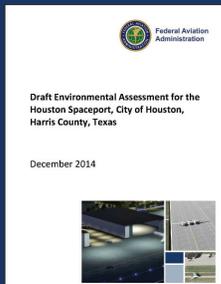
What is the Proposed Action?

- The FAA is proposing to:
 1. Issue a Launch Site Operator License to the HAS for operation of a commercial space launch site (i.e., Houston Spaceport) at Ellington Airport;
 2. Issue launch licenses to prospective operators that would allow them to conduct launches of horizontal take-off and horizontal landing reusable launch vehicles (RLVs) at Houston Spaceport; and
 3. Provide unconditional approval to the Airport Layout Plan modifications (designation of a launch site boundary and construction of proposed Spaceport facilities and infrastructure).
- A Launch Site Operator License remains in effect for five years from the date of issuance unless surrendered, suspended, or revoked before the expiration of the term and is renewable upon application by the licensee.
- A HAS Launch Site Operator License would be valid from 2015 – 2020.
- A launch license for a RLV is valid for a two-year renewable term and authorizes a licensee to launch and reenter, or otherwise land, any of a designated family of RLVs within authorized parameters.

Why Ellington Airport?

- To be successful as a commercial space launch site, an airport must meet the technical and operational requirements to accommodate horizontal take-off and horizontal landing RLVs, including:
 - a location within the Houston airport system;
 - a location in an area of comparatively low population density;
 - a runway with a minimum length of 8,000 feet;
 - a minimum of 45,000 square feet of hangar space; and
 - extensive airspace separation distances from other aircraft operating in the Houston area airspace.
- Ellington Airport meets these requirements.
- The following alternatives were not carried forward because they do not fully meet the technical and/or operational requirements as stated above:
 - William P. Hobby Airport, and
 - George Bush Intercontinental Airport

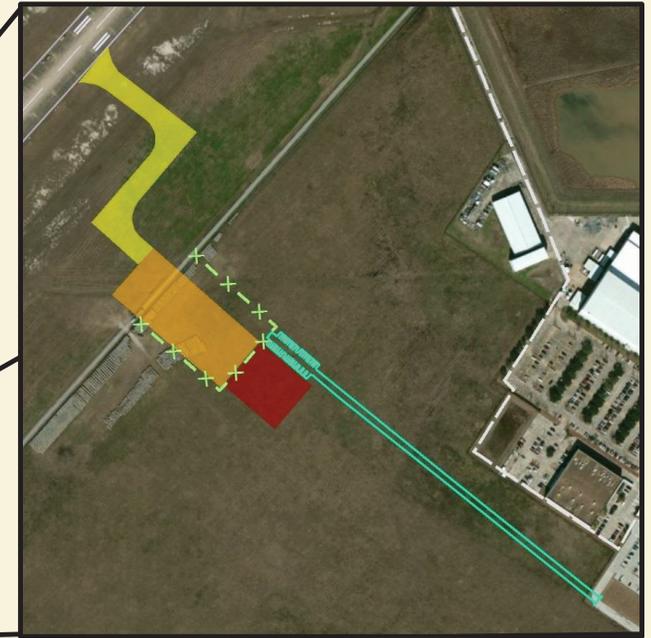
Under the No Action Alternative, the FAA would not issue a Launch Site Operator License to the HAS.





PROPOSED ACTION

Proposed Spaceport Development



- Vehicle parking area (approximately 30-35 parking spots)
- Access road
- FAA-approved fencing
- FAA compliant stormwater treatment pond in the vicinity of the proposed hangar and apron



NATIONAL ENVIRONMENTAL POLICY ACT

NEPA Process

- The National Environmental Policy Act (NEPA) requires all federal agencies to evaluate potential environmental impacts of any major actions they may propose and to inform and involve the public in the decision making process.
- A Draft Environmental Assessment (EA) has been developed for this project.
- A Notice of Availability of the Draft EA was published in the *Federal Register* on December 31, 2014 which started the 30-day agency and public review and comment period.
- The FAA will review and consider all comments before issuing a Final EA and associated finding.

Resources Analyzed

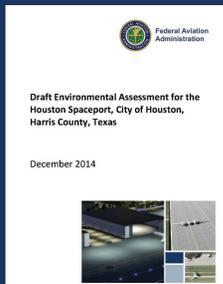
- Air Quality
- Climate
- Coastal Resources
- Compatible Land Use
- Department of Transportation Act: Section 4(f)
- Fish, Wildlife, and Plants
- Floodplains
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Historical, Architectural, Archaeological, and Cultural Resources
- Light Emissions and Visual Resources
- Natural Resources and Energy Supply
- Noise
- Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks
- Water Quality
- Wetlands

Agency Consultation

- Over 100 federal, state, and local agencies were contacted. For the full list, see Appendix A-1 of the Draft EA.

The following are a sample of agencies that responded during the preparation of the Draft EA:

- The State Historic Preservation Officer – concurrence on Section 106 of the National Historic Preservation Act effects determination received on June 6, 2014;
- The U.S. Fish and Wildlife Service – early coordination comments received November 4, 2013; and
- The Texas Parks and Wildlife Department – early coordination comments received on December 3, 2013.

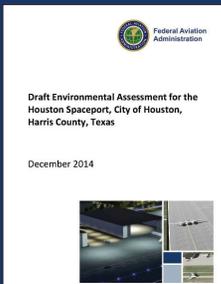
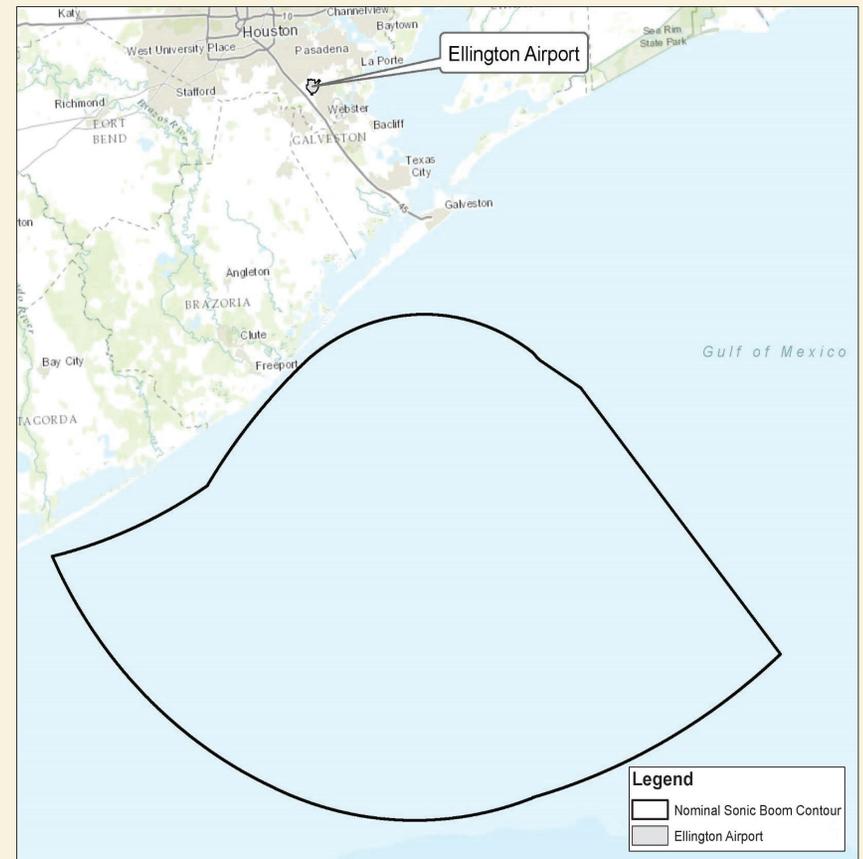


POTENTIAL ENVIRONMENTAL EFFECTS



Noise and Compatible Land Use

- Construction activities would temporarily increase noise in the vicinity of the Airport depending on the nature of construction activities and the type of equipment being used.
- The RLVs proposed for operation at the Airport would produce noise from jet engine operations, similar to aircraft currently operating at the Airport.
- Analysis using the FAA's Area Equivalent Method indicates that the increase in the Day-night Level (DNL) 65 dBA contour area would be less than 0.01 percent between the No Action Alternative and Proposed Action.
- The RLVs proposed for operation at the Airport would create a sonic boom during the supersonic portion of the ascent and descent, which would occur over the Gulf of Mexico.
 - The sonic boom during the ascent would move at an upward angle and would not reach the ground.
 - The sonic boom during the descent would occur entirely over the Gulf of Mexico and would not be heard on shore (see right for exhibit).
- Given the industrial characteristics of off-shore oil rigs, the sonic boom is not likely to affect offshore oil rig personnel or day-to-day activities.

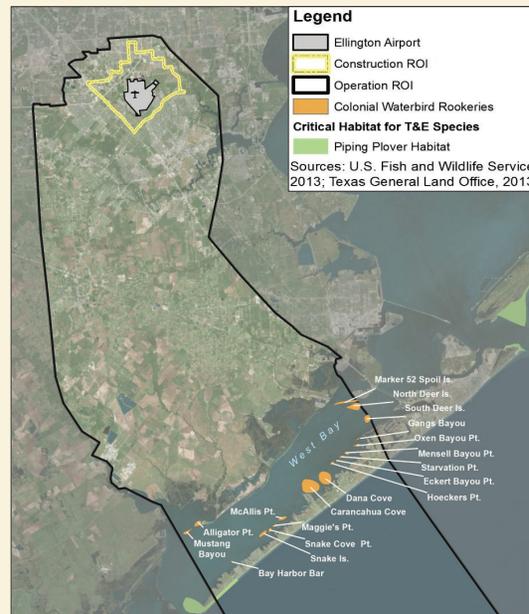




POTENTIAL ENVIRONMENTAL EFFECTS

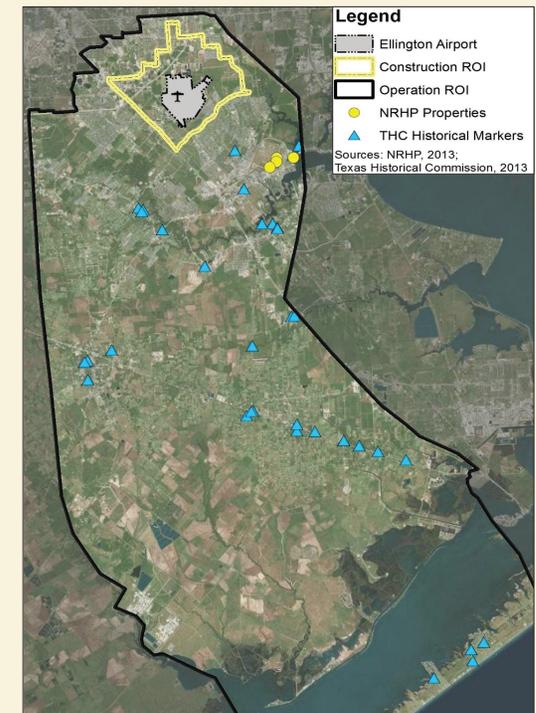
Fish, Wildlife, and Plants

- Construction activities would result in disturbance to individual animals due to excavation and grading.
- Due to the characteristics of existing operations at the Airport, the impact from the operation of the proposed RLVs would be similar to impacts from existing airport operations.
- The FAA determined the Proposed Action would have no effect on species listed under the federal Endangered Species Act.



Historic Resources

- Construction activities would not directly or indirectly affect resources listed on the National Register of Historic Places (NRHP).
- The Texas State Historic Preservation Officer (SHPO) concurs with the FAA's determination of "No Historic Properties Affected."





POTENTIAL ENVIRONMENTAL EFFECTS

Air Quality

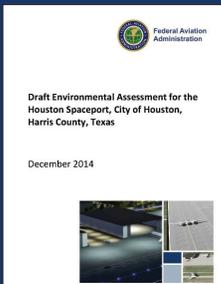
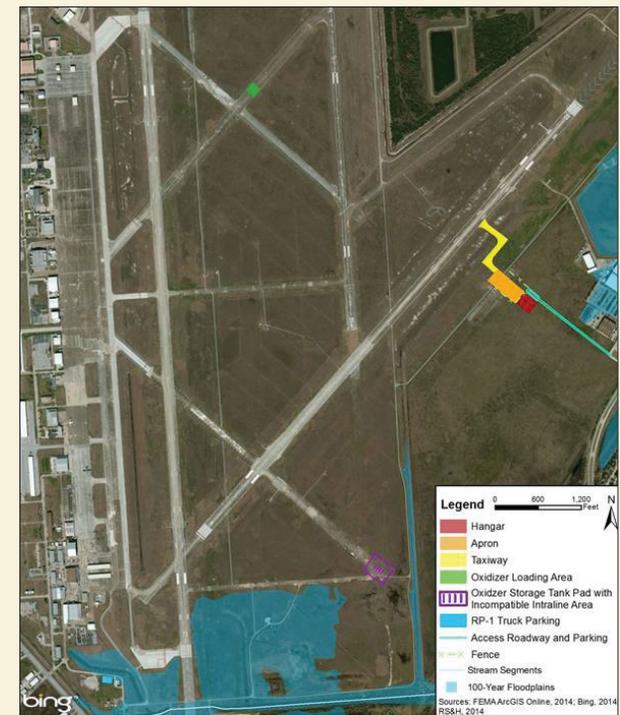
- Construction activities would result in a minor and temporary increase in local emissions. The use of best management practices (BMPs) would help to reduce air quality effects.
- The operation of RLVs would increase emissions, but would not result in exceedance of any air quality thresholds or standards.
- Operation of RLVs would increase greenhouse gas emissions, but the levels would be negligible.

Hazardous Materials

- The Proposed Action would increase the storage of hazardous materials on Airport property.
- The Proposed Action would not affect the status or remediation of known hazardous sites in and around the Airport.
- The Proposed Action would comply with all existing and future hazardous waste generator requirements, and all hazardous and solid wastes would be managed in accordance with federal, state, and local regulations.

Floodplains

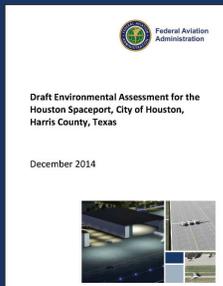
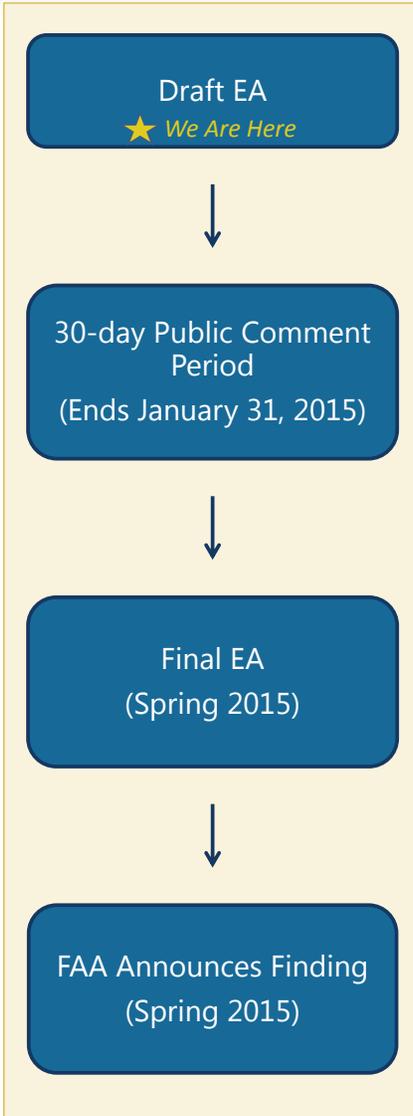
- The Proposed Action would not encroach on designated floodplains.
- The Proposed Action would increase annual stormwater runoff at the Airport by approximately 27.5 acre-feet, which the Airport's existing flood controls and drainage infrastructure could support.





PUBLIC PARTICIPATION

EA Process



How You Can Help

1. Speak one-to-one with project representatives.
2. Submit written comments.
3. Provide oral comments to the stenographer.
4. Submit comments by email to: houstonpaceportEA@houstontx.gov
5. Mail your written comments to:

Mr. Daniel Czelusniak
 Office of Commercial Space Transportation, Federal Aviation Administration,
 800 Independence Avenue, SW, Suite 325, Washington, DC 20591.

All mailed comments must be postmarked on or before January 31, 2015 to be considered by the FAA for the Final EA.

- For more information, visit:
http://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/ne_pa_docs/review/documents_progress/
- A printed copy of the Houston Spaceport Draft EA is available at the following locations:

Clear Lake City-County
 Freeman Branch Library
 16616 Diana Lane
 Houston, TX 77062

Friendswood Public Library
 416 South Friendswood Drive
 Friendswood, TX 77546

Alvin Library
 105 South Gordon Street
 Alvin, TX 77511

Hitchcock Public Library
 8005 Barry Avenue
 Hitchcock, TX 77563

MEDIA CONTACT

HOUSTON SPACEPORT DRAFT EA – PUBLIC MEETING

For further information, please contact the FAA Media Communications Specialist.

Mr. Hank Price
Media Communications Specialist
Federal Aviation Administration
202-267-3447 (office)
703-795-7064 (cell)
hank.price@faa.gov

This Page Intentionally Left Blank

APPENDIX F-2

DRAFT EA COMMENTS AND RESPONSES

This Page Intentionally Left Blank

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: **houston-spaceportEA@houston-tx.gov**
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: Nick Haby Date: 1/22/15

Organization/Affiliation: City of Friendswood

Address: 910 S. Friendswood Dr

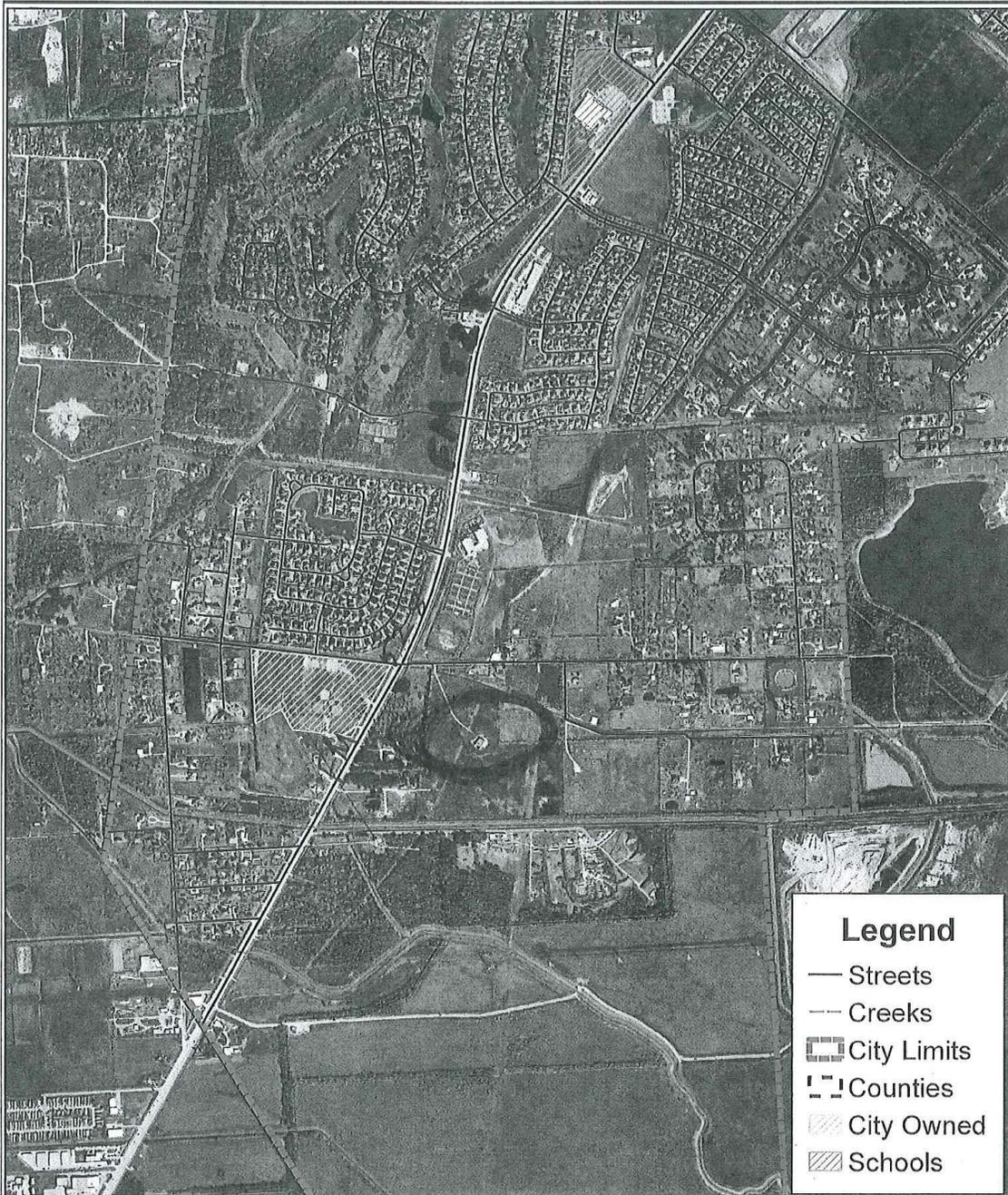
City, State, Zip Code: Friendswood, TX 77573

Comments: [See attached map RE: unit tower.]



City of Friendswood

Nick Haby
Planning Manager /
Public Information Officer



Disclaimer: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. Gov. C. §2501.102 The user is encouraged to independently verify all information contained in this product. The City of Friendswood makes no representation or warranty as to the accuracy of this product or to its fitness for a particular purpose. The user (1) accepts the product AS IS, WITH ALL FAULTS; (2) assumes all responsibility for the use thereof, and (3) releases the City of Friendswood from any damage, loss, or liability arising from such use.



City of Friendswood
 910 South Friendswood Drive
 Friendswood, Texas 77546
 (281) 996-3200
www.ci.friendswood.tx.us

Friendswood GIS Mapping

3111 W. Parkwood Ave



1" = 1,415'

Responses to Nick Haby's Comments

The commenter does not provide context for his comment. To the extent the commenter was referring to safety, the fixture at 3111 W Parkwood Ave is shown on Federal Aviation Administration (FAA) aeronautical charts as a lighted structure. Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light should be reported immediately by calling 877-487-6867. For more information, see the FAA's Light Outage Reporting website at: <https://oeaaa.faa.gov/oeaaa/external/content/lightOutageReporting.jsp>.

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: Natalie Cantu Date: 1/22/15
 Organization/Affiliation: Manned Spaceflight Education Foundation
 Address: 880 SWISS
 City, State, Zip Code: Houston, Tx 77015

Comments: [The idea for the spaceport sounds great!]
[The only real hesitation I have is the impact on
NASA. Will this take "business" away from JSC?
I am worried about jobs being taken away from
JSC employees if there is "nothing for them to do," because →

(Use reverse side for more space)

(cont. on back)

**Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



of sending satellites, etc. ~~via~~ via the space port. }
I am in favor of the space port, I am just }
concerned that it would interfere with NASA. }

Thank you for your comments. Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

Responses to Natalie Cantu's Comments

The comment supporting the Houston Spaceport is noted.

Regarding the Proposed Action's effect on the National Aeronautics and Space Administration (NASA), specifically Johnson Space Center (JSC), there is the potential that both on- and off-Airport development could be attracted to Ellington Airport. Any such development would be dependent on the outcome of the Houston Airport System (HAS) acquiring a launch site operator license and other commercial space launch providers acquiring individual launch licenses for operations at Houston Spaceport. Off-airport development could include commercial and government/medical/educational land uses attracted to the Houston Spaceport. The nature, timing, and extent of such development cannot be foreseen at this time. Regarding taking business away from JSC and sending satellites via the Houston Spaceport, it is possible that commercial space providers operating at Houston Spaceport could transmit satellites or other payloads into space. However, the Proposed Action is not anticipated to compete with JSC business or result in the loss of NASA jobs.

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston.tx.gov
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: JEFFREY R. HEITZMAN Date: 1-22-2015

Organization/Affiliation: _____

Address: 2902 THISTLEDOWN DRIVE

City, State, Zip Code: LEAGUE CITY TX 77573-5933

Comments: [LOOKING FORWARD TO SEEING THIS APPROVED.]

SAFETY MUST BE TOP CONSIDERATION. SAFETY OF NOT ONLY THE SPACEPORT ITSELF BUT ALSO SAFETY OF THE DOWNRANGE GULF OF MEXICO. CAN'T EMPHASIZE SAFETY ENOUGH GIVEN THE EVENT AT THE MID ATLANTIC SPACEPORT RECENTLY.

(Use reverse side for more space)

Responses to Jeffrey Heitzman's Comments

The comment supporting the Houston Spaceport is noted.

Regarding safety, as described in Section 1.2 of the Draft Environmental Assessment (EA), the FAA's mission is "to ensure public health and safety and the safety of property while protecting the national security and foreign policy interests of the U.S. during commercial launch and reentry operations." The safety of proposed commercial space launch operations is covered through the FAA licensing process. Commercial launches must comply with launch safety criteria found in 14 CFR Part 417. To gain approval for a launch site location, an applicant must demonstrate that for each launch point proposed for the launch site, at least one type of expendable or reusable launch vehicle can be flown from the launch point safely. Procedures for completing the launch site location review are described in 14 CFR §§ 420.19 to 420.29, Licensing and Safety Requirements for Operation of a Launch Site. In addition to licensing the site, the FAA licenses commercial space launch operations. Commercial space launch operators would have to comply with 14 CFR 415, Launch License, specifically 14 CFR §§ 415.109 to 415.133 for operations conducted from a non-Federal launch site, and 14 CFR Part 417, Launch Safety. This includes but is not limited to, safety organization, flight safety analysis, ground safety information, acceptable flight risk, flight readiness and communications plans, and safety at the end of the launch.

All of the proposed improvements associated with the Proposed Action would be designed, constructed, and operated to ensure safe operating conditions.

Public Comment Form

Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to:

Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: John Boynton Date: 1/22/2015
 Organization/Affiliation: ex-NASA eng'r, P.E. consultant '83-'93
 Address: PO Box 503
 City, State, Zip Code: South Houston Tx 77587

Comments: [Plan now for a safe-passage corridor from Ellington south of La Porte & north of Shoreacres to the Gulf of Mexico over Galveston Bay so can accommodate eventual super-reliable vertical-launch piloted recoverable boosters.]

(Use reverse side for more space)

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston.tx.gov
- ③ Mailing your comment form to:
 - Mr. Daniel Czelusniak
 - Federal Aviation Administration
 - Office of Commercial Space Transportation
 - 800 Independence Avenue, SW, Suite 325
 - Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: John Bomfan Date: 4/22/15

Organization/Affiliation: EX-WALK OHSU (62-13)

Address: _____

City, State, Zip Code: _____

Comments: YOU GUYS ARE DOING A GREAT
JOB!! ELLINGTON IS A NATURAL
LOCUS OF SPACEPORT FACILITIES AND
SHOULD GET FAA APPROVAL

(Use reverse side for more space)

Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas



Handwritten comments on a lined form:

Boytan
John
[Good job]

Thank you for your comments. Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

Ideas to Consider for Ellington Spaceport per John H. Boynton P.E.* (281-488-0292 LL)

Launch Scenarios:

1. Horizontal takeoff - gas turbine and ramjet to suborbital and plus rocket to orbit
2. Piggyback launch - jet to staged rocket to suborbit and orbit
3. Vertical launch** - winged/piloted rocket booster with rocket stages to orbit (booster lands back at Ellington horizontally, 2nd stage recovered with chutes & C-130 "snatch") }

Commercial Enterprises:

1. Pleasure rides*** both suborbital & 2-pass orbital with winged entry vehicle
2. Satellite to orbit for global companies friendly w/USA
3. Satellite repair with 2 astronauts in winged entry vehicle
4. Devices in orbit to clear out space debris (funded by ALL space-faring countries)
5. Private company science research, espec proprietary studies
6. Mail/package delivery in 2 hours or less (specialty high-value items)
7. High-end personal travel (2 to 4 passengers per flight) for global distances

Government Contracts:

1. Science to orbit (non-proprietary, eg NSF or FDA)
2. Service ISS with smaller, cheaper more frequent recoverable stages & entry vehicles
3. DOD - fast-response troop and/or equip carriers or Dynasoar bomber concept (orbital)
4. GPS system - new satellites or repair of older ones (DOD & FAA support)
5. Specialized contracts to NASA including deep space with small recon vehicles }

*Retired, was once registered prof. engr in TX, CO, & ME (1972-1992)

**Abort considerations: manned booster super-reliable w proven systems, trajectory over low-density residential (Pasadena/Clr Lake), Clear Lake, Galveston Bay to Gulf, pilot flies abort if nec

*** Pleasure incorporate TRIPLE redundancy where possible, plus manual backup of double redun

Responses to John Boynton's Comments

The comments supporting the Houston Spaceport are noted.

Regarding the comment about a vertically launched vehicle, as described in Section 1.1.1 of the Draft EA, under the Proposed Action, the FAA would, in part, issue launch licenses to prospective vehicle operators that would allow them to conduct launches of horizontal take-off and horizontal landing reusable launch vehicles (RLVs) from the Houston Spaceport. These vehicles are described in Section 2.1.1 of the Draft EA. According to the HAS, there are no plans for vertical launches from the Houston Spaceport.

Regarding the "launch scenarios" comment, as described in Section 1.1.1.2 of the Draft EA, two types of horizontal RLVs are being considered to operate at the Houston Spaceport: the Concept X RLV and the Concept Z RLV. The Concept X RLV would take off under conventional jet engine power and make either a powered or unpowered (glide) landing.

The Concept Z RLV is a two-part vehicle, including a carrier vehicle and an attached RLV that would separate at an altitude approximately 40,000 feet above mean sea level. The Concept Z RLV would land gliding. Unlike vertical launch vehicles, the operation of these RLVs would be similar to the operation of commercial jet aircraft. These vehicles are described in detail in Section 2.1.1 of the Draft EA.

Regarding the "commercial enterprises" and "government contracts" comments, the list of activities are not part of HAS's proposal and thus are not within the scope of the EA.



Public Comment Form

Environmental Assessment for the Houston Spaceport, City of Houston, Harris County, Texas



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: [REDACTED] Date: 1-22-2015

Organization/Affiliation: _____

Address: [REDACTED]

City, State, Zip Code: League City, TX 77573

Comments: [I am concerned with the impact of the RLV traffic on smaller airports and air traffic that may be located under the proposed flight paths. I am hoping that this activity will not cause frequent Temporary Flight Restrictions for the local areas.]

(Use reverse side for more space)

Responses to [REDACTED] Comments

Appendix B (*Airspace and Airports*) of the Draft EA discloses the potential effect of operating reusable launch vehicles to and from Ellington Airport. Nominal spaceport operations would not be expected to significantly impact operations at nearby airports because the flight route would be carefully coordinated to avoid the airspace of publicly owned airports in the area.

HAS proposes to provide RLV operators the ability to conduct up to 50 launches per year at the Houston Spaceport during the study years for this EA (2015-2019). Prior to each launch, coordination with the FAA Office of Air Traffic would result in the identification of a flight corridor such that a Temporary Flight Restriction (TFR) would be put into place in the RLV operating area when flights occur. Temporary closures of existing airspace may be necessary to ensure public safety during the proposed operations. Advance notice via a Notice to Airmen would assist general aviation pilots in scheduling around any temporary disruption of flight activity at Ellington Airport. Launches would be infrequent (less than 1 percent of the total operations occurring at Ellington Airport), of short duration, and scheduled well in advance to minimize interruption of airport operations. Refer to Sections 1.2.3 and the beginning of Section 2.1 of the Draft EA.

Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to:

Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: Christopher Maginnis Date: 1/22/2015
Organization/Affiliation: BAHEP / League City Chamber
Address: 2026 Lakeside Dr.
City, State, Zip Code: Seabrook, TX 77586

Comments: I work for Waddell + Reed in Webster +
serve on BAHEP + Chamber Committees. The
address above is my residence.

(Use reverse side for more space)

Responses to Christopher Maginnis' Comments

As described in Section 3.4 of the Draft EA, the City of Houston currently implements airport compatible land use regulations in the Code of Ordinances, Chapter 9, Article VI (Ordinance No. 2008-1052). This article establishes airport land use areas that extend 1.5 miles from either side of a runway center line and 5 miles from each runway end. The article establishes three land use tiers that have restrictions created to protect each HAS airport, including Ellington Airport, from the encroachment of sensitive land uses. However, Article VI was approved to encourage the management of compatible land uses within an HAS airport's aviation noise contours and not regulate population density under a proposed launch vehicle's flight path.

The FAA is not responsible for managing population density growth within a local community. HAS does not have land use control outside of its property boundaries and it cannot dictate local land use or zoning designations. Therefore, neither the FAA nor HAS have the authority to regulate local land use or zoning. If there comes a time when the FAA is evaluating a license renewal, or if during the life of the initial license the FAA becomes aware of a potential public safety concern, the FAA will undertake the same safety review as it did for the initial license application. Regarding safety reviews, please see the response provided for Mr. Heitzman's comment on page F-71.

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: Michael Lambert Date: 01/22/15
 Organization/Affiliation: Manned Space Flight Education Foundation
 Address: 407 Ironbark Court
 City, State, Zip Code: Webster, TX, 77598

Comments: The idea of the spaceport is great. The design is beautiful and the education opportunity is fantastic. One thing I noticed was that there was no exhibit board regarding the economics of the operation. How much will the project cost?

(Use reverse side for more space)

**Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



What is the projected yearly cost and revenue?
Will it put an economic strain on the government
that could affect budgets like NASA's? Another
concern I have is the public view. The commercial
space flight industry does not benefit space
exploration if they fly up just to take people who
want to experience microgravity for a couple of
minutes. Again, I love the idea, I'm just concerned
for the future of the project, NASA, and space
exploration.

Thank you for your comments. Please provide comments no later than January 31, 2015, or 30 days after the Federal Register notice (whichever is later), to ensure they are considered during preparation of the Final EA.

Responses to Michael Lambert's Comments

The comment supporting the Houston Spaceport is noted.

Regarding the economic comments and questions, it is beyond the purview of the FAA to assess the economics of constructing and operating a spaceport. Construction of the proposed Houston Spaceport is currently in the preliminary design phase. More detailed design activities would be initiated later in the design process, at which time detailed cost estimates for the project would be further developed. This aspect of the project is the responsibility of the HAS.

Regarding the comment about budgets, construction and operation of the proposed Houston Spaceport would not affect NASA's budget.

Regarding the comment about the public's view, the comment period for the Draft EA and the public meeting in Houston provided an opportunity for the public to express their comments and opinions. Based on the feedback received during the public meeting and the comments received during the comment period, the FAA does not consider the Proposed Action to be highly controversial on environmental grounds, including the size, nature, or effect on the human environment.

Regarding the comment about the commercial space flight industry, the FAA does not govern the ideas of the industry. Rather, the market influences how commercial launch providers operate their business. The FAA has the responsibility, under the Commercial Space Launch Act, to (1) promote economic growth and entrepreneurial activity through use of the space environment for peaceful purposes; (2) encourage the U.S. private sector to provide launch vehicles, reentry vehicles, and associated services by (i) simplifying and expediting the issuance and transfer of commercial licenses, and (ii) facilitating and encouraging the use of government-developed space technology; (3) ensure that the Secretary of Transportation provides oversight and coordinates the conduct of commercial launch and reentry operations, issue and transfer commercial licenses authorizing those operations, and protect the public health and safety, safety of property, and national security and foreign policy interests of the U.S.; and (4) facilitate the strengthening and expansion of the U.S. space transportation infrastructure, including the enhancement of U.S. launch sites and launch-site support facilities.

**Public Comment Form
Environmental Assessment
for the Houston Spaceport,
City of Houston, Harris County, Texas**



The Federal Aviation Administration prepared a Draft Environmental Assessment (EA) to assess the potential environmental impacts of the Houston Airport System's proposal to operate a commercial space launch site at the Ellington Airport in Harris County, Texas and offer the site to commercial reusable launch vehicle (RLV) operators for the horizontal take-off and horizontal landing of RLVs. Please record your comments on this form and submit by:

- ① Filling out this form and dropping it in the comment box at the public meeting
- ② Submitting comments electronically to: houston-spaceportEA@houston-tx.gov
- ③ Mailing your comment form to: Mr. Daniel Czelusniak
Federal Aviation Administration
Office of Commercial Space Transportation
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

Please Note: Written comments become part of the administrative record associated with this Proposed Action. Individual citizens may request that their name and/or home address be withheld from public disclosure, which will be honored to the extent allowable by law. If you wish to have your name and/or home address withheld, you must check the box(es) below. Please note that contact information for individuals or officials representing organizations and businesses may be disclosed.

- Please add my name to the mailing list for future updates.
- Please withhold my name from public disclosure to the extent allowable by law.
- Please withhold my address from public disclosure to the extent allowable by law.

Please provide comments no later than January 31, 2015, or 30 days after the *Federal Register* notice (whichever is later), to ensure they are considered during preparation of the Final EA.

PLEASE PRINT CLEARLY AND LEGIBLY

Name: JAMES W. RICE Vice Chm Date: 1/22/15
 Organization/Affiliation: NORTHROP RICE USA, INC.
 Address: P.O. Box 154
 City, State, Zip Code: LEAGUE CITY, TX 77573

Comments: [The concept of an Ellington Launch site is very good + appropriate for Houston with its space background. Is there any parallel effort by other agencies i.e. NASA, Nat Science Foundation DARPA to develop launch vehicles capable of the flight profile.] (Use reverse side for more space)

Responses to James Rice's Comments

The comment supporting the Houston Spaceport is noted.

Regarding the comment about other agencies' efforts, NASA and the Department of Defense each implement their associated space-related missions. The FAA regulates the commercial space industry and not government launch activities.

19 January 2012⁵

Mr. Daniel Czelusniak
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave SW, Suite 325
Washington, DC 20591

Re: Proposed Houston Spaceport

Dear Czelusniak,

I studied the Houston Spaceport Draft Environmental Assessment (EA) and have several areas of concerns. I live only three miles from the Southeast border of Ellington Field in the Oakbrook West subdivision of Clear Lake City which was annexed by Houston many years ago. The noise level now from airplanes flying overhead is very annoying. The noise level increased when Ellington Field was sold to Houston Airport System and seems to grow more frequent as the years go by. Indeed, my neighbors have complained about it. The draft EA says with the addition of the Spaceport the increase of noise will only be minor. It seems to me that the level for noise measurement is for what can be safely tolerated and not what is actually comfortable for nearby neighbors of an airport. Also, the EA measurement for noise did not take into account that routine engine testing will be done adding to the noise level if a Spaceport is built. During the licensing period there will be 100 operations of RLVs per year (50 launches and 50 returns) permitted, but I assume that after that time period, it is more than likely that there will be an increase in that number in the following period of time. Also the draft mentions that the surrounding areas are inhabited by medium to upper income families which infers they can just pick up and move if they don't like living near the Spaceport. My neighborhood has many retirees living here. Moving for many of us is not an easy option especially when living next to a Spaceport will depress the value of the home as well as the opportunity to sell it for what it was worth before the Spaceport was built.

Another one of my concerns is the air quality. Ellington Field has been rated a nonattainment area for Qzone 3, ranging from severe to marginal over the years. So, the airport is already experiencing problems with air quality. Besides having many older people living in the area, there is an Assisted Living Center that is located next to the southeast border of Ellington Field. Contaminants in the air are a concern. According to the Sonny Carter Training Facility, contaminants put in the air from jet engine testing and the operations performed for extended periods could impact the quality of the makeup air where divers refill their Nitrox scuba tanks for use. In the EA draft, there was no limit put on engine testing; it was just described as "routine". After the Spaceport is built, there will also be more diesel trucks bringing in fuel for the RLVs. Unless it is "green" clean diesel, diesel fuel exhaust is a strong air pollutant. A number of regular vehicles use diesel and the increase in maintenance and employees with the new Spaceport will only add to the poor air quality.

An increase in flooding because of more paved areas where there once was farmland and open fields may be a problem. This is a Floodplain area. Even with stormwater drainage and retention ponds built at the airport that may not be enough. Flooding in my neighborhood during heavy rains has happened in the past as the drainage in Clear Lake City is not as adequate or maintained as it should be. A large increase in paved areas only adds to the problem. Indeed, the increase in new housing all the way over to the borders of Ellington Field have increased the amount of cement and paved areas. In addition, the bayous are affected. Horsepen Bayou which runs from Ellington through this area has been tested and shown to be polluted with bacteria. The construction of the Spaceport, while forecast to only last a year, will impact the ground water as well as the bayous. There will also be construction of new roads as well with a four lane highway built from Preston Rd to Genoa-Red Bluff and a bypass from Highway 3 to Space Center Blvd. New businesses related to the Spaceport plan to build off site nearby. All this build up in the area will only add to the probability of flooding.

Re: Proposed Houston Spaceport

Page 2 of 2

[The re-entry of the vehicle will create a sonic boom over water, the contour of the sonic boom comes within 30 miles of the Gulf coastline. The impact of the sonic boom will be absorbed by water. Noise and vibration is magnified underwater. This will have an adverse effect on the marine life in the Gulf. While the EA mentions oil rig workers, it did not take into consideration the effect the sonic boom would have on marine life in the Gulf itself.]

[I am very concerned about the safety issue of having the Spaceport so close to home. Not only with the increase in the possibility of accidents involving fuel being trucked into the area, but also with inadvertent fuel spills at the airport, leaking storage tanks, fires and explosions, and air accidents involving the RVLs. Additionally, I have not heard anything about how well these reusable launch vehicles have performed in testing. The commercial Spaceport is being located in the Southeast portion of Ellington Field. Also a tanker truck parking area along with a temporary oxidizer storage area will be built at the southwest corner of Ellington Field and the fuel will be transported to the oxidizer loading area at the northern end of Ellington as needed. The loading function is deemed hazardous due to the unique handling and equipment required. I feel that unloading LOX or N2O to a temporary storage facility as well as the storing and then transporting to a new area at the airport has its own dangers. The new Spaceport will also bring an increase in other hazardous materials in use due to maintenance and cleaning activities needed. A Spaceport is not the same as an airport, the type of oxidizing fuel needed to boost the separating vehicle into space is much more volatile than jet fuel and putting the two fuels aboard one vehicle is very sensitive. A Spaceport so close to residential areas is not wise.]

[The notice for soliciting comments from the public on the building of the Spaceport at Ellington was only published in the local Houston Chronicle newspaper on the 15th of January 2015. A public meeting is set for the 22nd of January with deadline for written comments set for 31 January 2015. This is inadequate. There will be many affected in this area who will not even see the newspaper notice much less have a chance to read the EA Draft. The television media has not covered this issue at all. How is it that the FAA notified numerous agencies, politicians, related businesses, and associations of the proposed Spaceport at Ellington Airport the middle of last year seeking their input and then furnished them with the Draft of the Environmental Assessment at the end of the year, but no such early notification was given to the public? Surely the possibility of building a Spaceport is newsworthy enough to alert the media back in 2014 so that more discussion could be held by the residents of such an important undertaking. The inadequate public notice may satisfy legal requirements, but it looks like the FAA does not want to take into consideration the concerns of people who will be most affected by the Spaceport. While the EA draft does not seem to find any problems, there are areas which the draft did not address; i.e., the reliability of the RLVs, the routine testing of engines as to the effect on noise and air quality, additional construction of nearby businesses related to the airport industry, and sonic booms over the Gulf and their effect on marine life to name just a few. Also, the building of a bypass road from Highway 3 to Space Center Boulevard will definitely change traffic patterns in the area as well. Not only will there be an increase in trucks on the road and more wear and tear on Highway 3 and Space Center Blvd, but it looks like the Recycling Center on Ellington Field would no longer be convenient to use. Clear Lake City was a lovely area in which to live when we moved here 30 years ago. It was quiet and the people were courteous and friendly. Green meridians in the streets and all the trees in the neighborhoods make Clear Lake one of the prettiest areas in Houston. The quality of life here will undoubtedly be adversely affected if the Spaceport is built.]

Yours truly,


Dorothy Sherman15210 Seahorse Drive
Houston, Texas 77062

Responses to Dorothy Sherman's Comments

Regarding the comments on noise, FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, contains the FAA's policies and procedures for compliance with NEPA and the CEQ's NEPA implementing regulations (40 CFR parts 1500-1508). Per the Order, the FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from FAA activities must be established in terms of yearly day/night average sound level (DNL) as FAA's primary metric. The DNL metric is the average noise level over a 24-hour period. The noise between the hours of 10pm and 7am is artificially increased by 10 dB to take into account the decrease in community background noise of 10 dB during these hours and the increased sensitivity to noise at night.

According to the Order, a significant noise impact would occur if analysis shows that the Proposed Action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. As described in Section 4.12, the Proposed Action would not cause noise sensitive areas to exceed this threshold. The analysis results indicate that the increase in the DNL 65 dB contour area is less than 0.01 percent between the No Action Alternative and Proposed Action. Note that the Proposed Action includes a maximum of 50 launches per year (a launch includes a take-off and landing) of vehicles using engines similar to those operating at Ellington Airport, whereas Ellington Airport currently experiences over 100,000 operations per year. The FAA determined that the noise generated by the Proposed Action would not cause a significant impact.

Regarding engine testing, 15 launch vehicle engine tests would be conducted per year. Noise from engine testing combined with noise from actual launches would not result in a significant impact. Sections 2.1.1 and 4.12.2.2 of the EA were updated to include engine testing.

Regarding the number of operations, if launch vehicle operators propose more than 50 launches in a specific year, the FAA would re-evaluate the potential environmental impacts (including noise) on the human environment, which could include preparing a new or supplemental NEPA document.

Regarding the surrounding area, the FAA used data provided by the U.S. Census Bureau when discussing the existing conditions for socioeconomic and environmental justice (Section 3.13 of the Draft EA). As discussed in Section 4.14 of the Draft EA, the Proposed Action would not disrupt communities around Ellington Airport, nor would businesses or residents be forced to relocate. Assessing whether property values would increase or decrease as a result of establishing a spaceport at Ellington Airport is beyond the scope of the EA. Property values in the area are affected by many factors including proximity to the existing Ellington Airport. The FAA cannot predict what would happen to property values should the FAA issue a license to HAS.

Regarding the comments on air quality, Ellington Airport is located within an area designated as marginal nonattainment of the U.S. Environmental Protection Agency (USEPA) 2008 National Ambient Air Quality Standards (NAAQS) for ozone (O₃) (see Section 3.1.1 of the Draft EA). The area is also still considered to be in severe nonattainment for the 1997 O₃ NAAQS. As discussed in Section 4.1 of the Draft EA, HAS and/or

launch vehicle operator coordination may need to occur with the Sonny Carter Training Facility to ensure that engine testing activities associated with the Proposed Action are conducted such that potential contaminants in refilling NITROX SCUBA tanks are minimized. Appendix C of the Draft EA states that 15 launch vehicle engine tests are estimated to be conducted per year. Section 2.1.1 of the EA was updated to include engine testing. Emissions resulting from the Proposed Action would be less than the applicable *de minimis* thresholds and are less than 10 percent of the region's emissions, indicating that the Proposed Action would not cause or contribute to new or existing violations of NAAQS. See Section 4.1 of the EA for further details.

Regarding comments on flooding and water quality, construction would be subject to requirements of the Texas Commission on Environmental Quality General Construction Permit (TXR15000) and would not occur within a 100-year floodplain (see Sections 4.7 and 4.15 of the Draft EA). The Proposed Action includes the construction of a storm water treatment pond (e.g., FAA compliant pond(s)) of sufficient size to collect rainfall runoff from new impervious surfaces. Therefore, the FAA does not anticipate the Proposed Action would result in significant impacts related to flooding or water quality in the area. No significant impacts to groundwater are expected. The potential cumulative effects of the Proposed Action when combined with other past, present and reasonably foreseeable projects in the area is discussed in Chapter 5 of the Draft EA. The Proposed Action would not result in significant cumulative impacts related to flooding or water quality.

Regarding the comments about a sonic boom's impact on marine life, sonic booms would occur at high altitudes and impact the surface of the Gulf of Mexico. The peak overpressure level generated from a launch vehicle descent would be 0.9 pound per square foot (psf), similar to a thunder clap, and would occur in a concentrated area of approximately 0.5 square mile. For the majority of the sonic boom footprint, sound levels would be closer to 0.1 psf. Based on (1) these noise levels, (2) sonic booms would occur a maximum of 50 times per year, and (3) marine species in the Gulf of Mexico are present in low densities, sonic booms from launches are not expected to adversely affect marine species.

Regarding the comments on safety, please see the response provided for Mr. Heitzman's comment on page F-71. Additionally, the storage of petroleum is regulated under 40 CFR part 112 and managed under provisions of Ellington Airport's Spill Prevention Control and Countermeasures Plan. The location of the proposed oxidizer loading area was coordinated among the FAA, HAS, Texas Air National Guard, and other airport tenants in order to meet safe distance separations. The risk of hazardous material releases due to tanker trucks, delivery lines, or other infrastructure would be limited by proper handling practices, in compliance with 14 CFR §420.65 and 14 CFR §420.67 for solid and liquid fuels, respectively. Various federal, state, and local laws regulate the use, storage, transportation, or disposal of hazardous materials. At this time, the FAA and HAS are not aware of any hazardous materials to be used for maintenance and cleaning activities associated with a spaceport. Prospective vehicle operators would need to follow all applicable federal, state, and local laws that regulate the use, storage, transportation, or disposal of hazardous materials. See Section 4.8 of the Draft EA for further details.

Regarding the comments about public notification, the following is a list of public notices associated with the Draft EA:

- » Notice of Availability (NOA) of the Draft EA was posted on Houston Spaceport website on December 30, 2014;
- » NOA was published in the *Federal Register* on December 31, 2014 (29 Federal Register 78936);
- » NOA was published in the Houston Chronicle on January 7, 2015; and
- » NOA display advertisements were published in the Bay Area Citizen, Pasadena Citizen, Friendswood Journal, and Pearland Journal on January 8, 2015.

In addition to the publications of the NOA, the Houston Chronicle independently published articles about the Draft EA, public meeting, and request for comments (January 13, 2015 - *Input wanted on spaceflight at Ellington Field*; January 27, 2015 - *Deadline approaching for Ellington Field spaceport comments*).

See Appendix F of the Final EA for a summary of public involvement activities associated with the EA. Comments on the Draft EA were requested in the NOA that was published December 30, 2014 on the Houston Spaceport website (<http://www.fly2houston.spaceport.com/news/houston-spaceport-draft-environmental-assessment-and-public-hearing>), as well as the NOAs published in the sources listed above.

Separate from the FAA's efforts, Houston public media published a story on April 23, 2014, "Could Ellington Field Someday Serve as a Spaceport?" ABC13 Eyewitness News also published a story on March 6, 2013, entitled "Could Houston be Getting [an] International Spaceport Soon?"

On July 17, 2013, HAS received Houston City Council support to continue moving forward in the application process. On September 4, 2013, HAS unveiled part of its vision for the future of Ellington Airport by releasing conceptual renderings of a possible Houston Spaceport to the public.

The FAA takes public comments seriously and appreciates your comments. The format of the January 22, 2015 public meeting allowed participants to view materials at their leisure and talk to FAA representatives and project team members. In addition, the format allowed for the attendees to talk among themselves, FAA representatives, and team members in an open forum.

Harvey D. Myers
15206 Seahorse Dr.
Houston, TX. 77062

January 21, 2015

Mr. Daniel Czelusniak
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave. SW, Suite 325
Washington, DC 20591

Subject: Cursory Review of The FAA Draft Environmental Assessment For The
Houston Spaceport, Harris County Texas, December 2014

COMMENTS RELATIVE TO REVIEW OF THE
HOUSTON SPACEPORT ENVIRONMENTAL ASSESSMNET

Introductory Comments:

I am greatly surprised and shocked that something of such importance was announced on January 15, 2015 by the Houston Chronicle for a meeting to take place on January 22, 2015 that would collect specific public comments on this 290-page document that no one knew existed until the Chronicle announcement. Further, all such comments are required to be submitted on or before January 31, 2015 in order to be included in consideration for granting the operators license.

In review of the HAS EA Early Coordination Mailing List, letter dated October 11, 2013, I find it consists of Federal, State, County, and City Politicians, Federal Agency's, and businesses, companies and corporations, entities that have positions of power and wealth to protect. Not one Houston public media source was listed (i.e.) The Houston Chronicle newspaper, Houston Radio or Television stations that could have disseminated the information to the general public who would have been perhaps more concerned with their health and safety of the proposed program.

This process seems very premature to allow/enable contractors with an unknown track record for flight program flights similar to those in this EA, to be allowed to use EFD to make up to 50 flights in the year 2015. I have yet to hear or read of any RLV company making a flight to the edge of space with a payload of paying customers. In fact Virgin Galactic "Spaceship Two" crashed in the Mojave Desert November 30, 2014 attempting, I believe, the concept Z flight profile.

It appears to me that EFD has been classified as an experimental flight test facility, in addition to an operational functioning airport. This seems to me of to be a definite conflict of interest.

Specific Comments:

COMMENTS TO SECTION 2.1

2.1.1.3 Pre-Flight Activities

The section alludes to ground and flight support rehearsing before each flight including various failure scenarios. I would like to think, that those scenarios would include being 60nm out in the Gulf at 40,000 to 55,000 feet altitude and not being able to conduct the low orbit ascent phase. If this were to happen, would the RLV and/or payloads be able to vent excess jet and or rocket fuel before returning to EFD. Do the RLV's design criteria include that feature? If so, would the fuel be non-toxic from here-ever-after, If not and the fuel dump contaminates the RLV exterior how would the exterior be decontaminated prior to flying over residential property back to EFD?

2.1.1.4 RLV Flight Profile

The section indicates the RLV would reach an apogee above 62 miles. At that altitude I believe that the aerodynamic control surfaces are marginally functional. Do the RLV's also use reaction control jets to assist for attitude control? If so, is that fuel toxic? If they were used, the process would surely contaminate the RLV exterior surface. If so, how would the RLV be decontaminated prior to returning to EFD?

Section 3.12/4.12: NOISE

Other environmental areas appear to be written using recorded parameters measures for communities around EFD to justify concerns within this proposal. This does not appear to be the case with the Noise Environment. I realize that it is not in the FAA's best interest to address this specific issue of noise, but what follows will, I hope, enlighten you as to why it is of great concern to me.

These sections describe a theoretical concept for determining noise loudness. Further it describes noise level boundaries for EFD. Figure 3-10 shows EFDs existing DNL 65 – 75 dBA noise contours. My residence is about 2 ½ to 3 miles from the SE edge of Ellington Airport and I doubt that these noise contours reflect the real world.

I am quite hard of hearing and I do wear hearing aids, however, while at home and/or working outside gardening I do not wear them. The noise from aircraft flying over Clear Lake City has been uncomfortable for my hearing for quite some time, both inside and outside of the house. I have taken notes, when possible, since April of 2014 where aircraft flying over and were extremely noisy. Ground testing jet engines has also been noted as a source of the loud noise. I have attached copies of my hand written accounts of the incidents just described.

I have tried to report excessive noise from aircraft in the area, but to no avail. Among my notes, I found one note dated 10-9-14 11:10am. Two (2) military jets with afterburners in use. They were moving from West to East at an estimated altitude of 1500 ~ 2000 feet. The noise was unbearable and I called 311 to report the incident to the airport noise control department. What I found was that HAS does not have a department to address the noise issue and I was referred to the Houston Police Department that I was told handled noise issues for the Houston area. I called that number given to me and the officer who took the call said he had no idea what I was talking about.

I would suggest that the FAA require the HAS to create a specific department to address the noise environmental concerns affecting the residents of communities surrounding EFD. Further I would suggest that a noise detection system be established where db levels could be detected and recorded twenty four (24) hours per day, seven (7) days per week, and fifty two (52) weeks per year. Instead of the hypothetically determined acceptable noise levels, accumulate actual noise levels, as they exist today. Doing so would provide a baseline from which the program could deviate. I suggest that the monitoring sites be located in each community that surrounds EFD.

The EFD 8,000 foot runway plus the defined maximum payload of the RLV should define the maximum RLV jet engine thrust to become airborne and therefore defining the expected noise level at that time. That is a parameter that should already be known. I don't find it in this EA.

3.13 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S HEALTH AND SAFETY RISKS

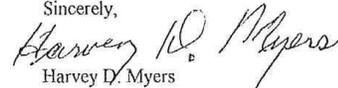
3.13.1 Socioeconomics

This section and others sections are using the acronym (ROI). The acronym does not appear in the section of ACRONYMS AND ABBREVIATIONS. It is always appropriate spell out the words prior to using the acronym for the first time. I was unable to find the first use of the acronym.

I appreciate having the opportunity to evaluate and comment on the Draft FAA Draft Environmental Assessment For The Houston Spaceport.

Thank you.

Sincerely,



Harvey D. Myers

AIRCRAFT
NOISE NOTES

HARVEY D MYER
15206 S. LAUREL
HOUSTON, TX 77058

http://digital.olivesoftware.com/Olive/OliveHoustonChroniclePrintComponentView.htm

5-1-2014

12:30 PM - 12:40 PM

2 FIGHTER VERY
NOISY TOUCH & GO @
ELINGTON. TRAJECTORIES
MOVED EAST TO WEST
DUE TO WEBSTER TO
FRIENDWOOD.

SEE CARD IN 4 RUNNER

6-5-2014 11:13 AM,
FIGHTER SET LOW LEVEL FROM
WSW OVER CLK GOING ENE
KICKED IN ADDITIONAL THRUST
~ 1000 - 1500 FT ALT. VERY
NOISY.

6-11-14 12:23 P.M.
JET KICKED IN AFTER BORDER
WEST TO EAST VERY LOUD
INSIDE HOUSE

4/28/2014

0-4-2014 10:27am
JET LOW ALTITUDE
EXCESSIVE FIGHTER
JET NOISE - AFTER-
BURNERS, HEADING
DUE EAST, VERY
VERY LOUD NOISE,

4-4-2014 10:27am
JET LOW ALTITUDE
EXCESSIVE FIGHTER
JET NOISE AFTER -
BURNERS, HEADING
DUE EAST, VERY
VERY LOUD NOISE,

6-18-2014

2:30 P.M. JET FIGHTER ACCELERATED
 WEST TO EAST OVER 15206
 SEAWORSE DR. VERY LOUD INSIDE
 HOUSE

7-15-2014 10:10 a.m.

SEVERAL JET FIGHTER FLYING
 LOW OVER CLL. VERY NOISY
 INSIDE HOUSE.

7-21-2014 9:30 a.m.

SEVERAL JET FIGHTERS FLYING
 OVER CLL RESIDENTIAL AREA VERY
 LOUD INSIDE HOUSE.

8-5-2014 10:02 a.m.

2 MILITARY JETS, MISSILES UNDER
 DELTA WINGS, ALTITUDE 1000 TO
 1500 FT. VERY LOW, FLYING FROM
 SSW TO ENE WITH AFTER BURNER
 KICKED IN, VERY VERY LOUD,
 IN GARDEN PICKING CHINESE LEG
 PLANT.

8-6-2014 10:07 a.m.

2 MILITARY JETS, MISSILES UNDER
 DELTA WINGS, ALTITUDE 2000 FT
 ALT. FLYING FROM SLL GOING NE.
 USING AFTER BURNERS TO ACCELERATE
 OVER MIDDLE OF CLL. VERY VERY
 LOUD.

8-30-14 10:20 a.m. JETS EXTREMELY
LOW ALT. & VERY NOISY INSIDE
HOUSE. HEADING FROM SW TO NE.

10-9-14 11:10 a.m. 2 MILITARY JETS
WITH AFTERBURNERS KICKED
IN WEST TO EAST BOUND -
1500 FT - 2000 FT EXTREMELY
LOUD & OUTRAGEOUSLY LOUD.

311 1525 a.m. 713 804-3131
CUSTOMER AVIATION NOISE
CONTROL 1/281 218 3800

AIRPORTS MANAGER FOR HOUSTON
AIRPORTS INCLUDING ELLINGTON

10-10-14 5:05 p.m. ONE JET WITH AFTER-
BURNER KICKIN. EXCEPTIONALLY NOISY.
INSIDE OF HOUSE WHILE COOKING.

10-14-14 11:00 - 11:10 a.m.
VERY LOUD JET NOISE, POSSIBLY
GROUND TESTING. JETS ENGINE
AT ELLINGTON BASE. VERY LOUD
WHEN ENGINE ACCELERATED (INSIDE
HOUSE)

10-15-14 6:21 p.m.
TWO MILITARY JETS, ALT ~ 1500 FT
FLYING SW GEAR DOWN, MAYBE LANDING
@ ELLINGTON. VERY LOUD IN HOUSE
6:29 p.m. APPARENTLY DOWING TOUCHDOWN

11-7-2014 9:23 am, VERY LOUD
JET ENGINE BEING ACCELERATED
& THEN DECREASING IN VOLUME,
COULD BE LOW FLYING COULD
NOT SEE AIRCRAFT, LASTED PERHAPS
2-3 MINUTES.

12-8-2014 9:35 a.m.
SEVERAL JET CROSSING CLE, LOW &
EXCESSIVELY NOISY.

HARVEY D. MYERS
15206 SEAHORSE DR
HOUSTON, TX 77062

Responses to Harvey Myers' Comments

Regarding the comments about public notification, please see the response provided for Ms. Sherman's similar comment on page F-91.

Regarding Ellington Airport's classification, the Airport is classified by the FAA as a commercial primary small-hub airport, currently certified for 14 CFR Part 139 operations. The Proposed Action would not change the Airport's classification.

Regarding the comment on Section 2.1.1.3 of the Draft EA, all reusable launch vehicle (RLV) concepts considered for operation are still in various stages of design. The abort scenarios would vary by vehicle operator and are expected to include a method for venting the oxidizers (such as liquid oxygen), but not for "dumping" the fuels. Venting of oxidizers would not contaminate the exterior of the vehicle. Regarding overall launch safety, please see the response provided for Mr. Heitzman's comment on page F-71.

Regarding the comment on Section 2.1.1.4 of the Draft EA, all RLV concepts considered for operation are still in various stages of design. Non-toxic reaction control systems (such as compressed air) are in development and would not contaminate the exterior of the vehicle. Regarding overall launch safety, please see the response provided for Mr. Heitzman's comment on page F-71.

Regarding the comments on noise, please see the response provided for Ms. Sherman's similar comment on page F-89. Also, note that the Proposed Action includes a maximum of 50 launches per year (a launch includes a take-off and landing) of vehicles using engines similar to those operating at Ellington Airport, whereas Ellington Airport currently experiences over 100,000 operations per year. The EA assumed that approximately five percent of annual operations (i.e., 2-3 launches) would be expected to occur during night-time hours (10pm to 7am).

Regarding Ellington Airport's current noise contours, these noise contours were developed prior to the Draft EA using the FAA's approved integrated noise model (INM). The home located at 15206 Seahorse Drive, Houston, Texas, 77062 is outside the DNL 65 dBA contour.

Regarding the comment about the FAA requiring HAS to create a specific department that handles public noise concerns, the FAA does not have the authority to require HAS to do this. This comment has been provided to HAS for their review.

Regarding the comment about the RLV thrust parameter, design parameters have been established for concept RLVs considered in the EA. This information does not necessarily reflect the exact parameters of RLVs that would operate at the Houston Spaceport. Instead, it defines the scope (or bounds) of the analysis, such that if a prospective operator's RLV parameters fall within the parameters in the EA, the environmental consequences of launching would fall within the EA's scope. Based on current information from Concepts X and Z vehicle developers, an appropriate representative aircraft was used in the noise model to conservatively model the acoustic parameters of engine noise from RLV operations.

Regarding the comment on socioeconomics, the abbreviation "ROI" (or Region of Influence) is defined in the first sentence of Chapter 3, Affected Environment. This acronym has been added to the list of acronyms and abbreviations at the beginning of the Final EA.

Alberts, David

From: HAS – Houston Space Port EA <houston-spaceportEA@houston-tx.gov>
Sent: Thursday, February 05, 2015 3:12 PM
To: Alberts, David
Subject: FW: Houston Spaceport, City of Houston, Harris County Texas (TPWD ERCS-10410, #34107)

From: Amy Turner [mailto:Amy.Turner@tpwd.texas.gov]
Sent: Thursday, January 22, 2015 2:26 PM
To: HAS – Houston Space Port EA
Cc: Amy Turner
Subject: Houston Spaceport, City of Houston, Harris County Texas (TPWD ERCS-10410, #34107)

Mr. Czelusniak,

[Thank you for submitting the Houston Spaceport, City of Houston, Harris County Texas (TPWD ERCS-10410, #34107) project for review. TPWD provide initial scoping comments for the project on December 3, 2013. After review of the Draft EA, TPWD has no additional comments to provide at this time and requests that the project applicant resubmit the project for review if the project undergoes significant changes from the proposed plans.]

Thank you,

Amy

Amy Turner, Ph.D.
Wildlife Habitat Assessment Program
Texas Parks and Wildlife Department
2805 N. Navarro, Suite 600-B
Victoria, Texas

o-361-576-0022 x 223
f- 361-578-4155

Responses to Amy Turner's Comments

The FAA acknowledges that the Texas Parks and Wildlife Department (TPWD) has no additional comments. If significant changes are made to the Proposed Action, the FAA or applicant will submit project changes to TPWD for review.



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1001 Indian School Road NW, Suite 348
Albuquerque, New Mexico 87104

ER 15/0006
File 9043.1

January 26, 2015

VIA ELECTRONIC MAIL ONLY

Daniel Czelusniak
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave., SW Suite 325
Washington, DC 20591

Dear Mr. Czelusniak:

Thank you for the opportunity to review the Department of Transportation (DOT), Federal Aviation Administration (FAA) Draft Environmental Assessment (EA) and Section 4(f) Evaluation describing the transportation and environmental impacts associated with Houston Spaceport, City of Houston, Harris County, Texas.

SECTION 4(f) EVALUATION COMMENTS

The Section 4(f) Evaluation indicates that there are four historic properties, 146 public parks, and one National Waterfowl Refuge that qualify as Section 4(f) properties within the project area, and that this project will not result in use or constructive use of these properties. After careful evaluation of this statement, the Department of the Interior concurs that there is no feasible and prudent alternative to the selected action and that all measures have been taken to minimize harm to these resources.

We appreciate the opportunity to review this document. Should you have questions about the Section 4(f) Evaluation comments, please contact David Hurd at (303) 987-6705.

Sincerely,

Stephen R. Spencer
Regional Environmental Officer

cc: SHPO TX Mark Wolfe (mark.wolfe@thc.state.tx.us)

Responses to Stephen Spencer's Comments

The FAA acknowledges the U.S. Department of Interior's concurrence with the FAA's Section 4(f) determination.



Pollution Control Services Department

101 S. Richey, Suite H
Pasadena, Texas 77506
FAX: 713-274-6475

713-920-2831

January 30, 2015

Mr. Daniel Czelusniak
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

RE: Comments on Draft Environmental Assessment for Houston Spaceport

Via: email to houston-spaceportEA@houston.tx.gov

Dear Mr. Czelusniak :

Thank you for the opportunity to submit comments regarding the Draft Environmental Assessment (EA) for Houston Spaceport. The Harris County Pollution Control Services Department (PCS) is the local jurisdictional regulatory authority for air issues in Harris County, Texas.

As acknowledged in the Draft Environmental Assessment report, Harris County is designated non-attainment for the Environmental Protection Agency's 1997 and 2008 National Ambient Air Quality Standards (NAAQS) for ozone and EPA has recently proposed a new, lower ozone NAAQS. For that and other reasons PCS respectfully submits the following recommendation regarding the referenced draft EA;

- The draft EA states that emissions from the Houston Spaceport project will not result in exceedance of any air quality threshold or standard. PCS recommends the addition of the following to the EA to support this claim:
 - A section detailing all sources of emissions related to the proposed spaceport construction and operations;
 - A summary of new emissions by contaminant expressed in tons per day and tons per year;
- PCS also recommends that the EA include discussion of how new emissions will be controlled or minimized and the type(s) of authorizations that will be required.

PCS appreciates this opportunity to offer comments and looks forward to the final Houston Spaceport EA. Should you have any questions, please contact Stuart Mueller-PCS Manager, Permits and Technical Services at 713-239-6414 or by e-mail at stuart.mueller@pcs.hctx.net.

Sincerely,

Bob Allen

Cc: Paula Warren, Harris County Judge Ed Emmett
Jacque Darbonne, Harris County Precinct Two
Dr. Umair Shah, HCPHES
Rock Owens, County Attorney's Office
Arturo Blanco, City of Houston
Ashley Wadick, Director TCEQ Region 12

Responses to Bob Allen's Comments

As described in Appendix C of the EA, emissions from construction activities associated with the Proposed Action were estimated based on a projected construction activity schedule, including the number of vehicles/pieces of equipment, the types of equipment/type of fuel used, vehicle/equipment utilization rates, and the year(s) construction would occur.

Since the proposed RLV operations at the Houston Spaceport would be sporadic and would be dependent on the RLV operator or type of cargo in transit, a summary of new emissions by contaminant expressed in tons per day is not available. See Section 4.1 of the EA for the operation emissions expressed in tons per year.

Emissions associated with the construction and operation of the Proposed Action are within USEPA's *de minimis* thresholds and are not expected to significantly affect the air quality of the area. Accordingly, no air quality mitigation measures are proposed. However, as described in Section 4.1.2.2 of the EA, best management practices can be applied during the project construction phase to ensure adherence to local dust control regulations and generally provide a good faith effort to minimize emissions wherever possible.



January 30, 2015

Mr. Daniel Czelusniak
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Avenue, SW, Suite 325
Washington, DC 20591

RE: Letter of Support for the Proposed Houston Airport System's Spaceport at Ellington Airport

Dear Mr. Czelusniak:

[On behalf of the Board of Directors of the Bay Area Houston Transportation Partnership (BayTran), I am pleased to offer this letter of support for the Houston Airport System's proposal to establish and operate a commercial space launch site at Ellington Airport in Houston, Texas. BayTran fully endorses this project recognizing that this facility would help establish the City of Houston and the State of Texas as a national and international node for commercial space transportation. The proposed facility is the perfect compliment to the National Aeronautics and Space Administration (NASA) complex also located in the same region in Houston.

BayTran is the regional Transportation Management Organization (TMO) for the Houston Bay Area, and was established to promote transportation, infrastructure and economic development in the Gulf Coast region. BayTran works to advance all modes of transportation and supports the redevelopment of Ellington Airport for spaceport operations. Spaceport development at this site is consistent with the existing land use and is a cost effective use of under utilized property. As a spaceport, the facility will provide a commercial space launch site for the commercial operation of horizontal take-off and horizontal landing of reusable launch vehicles. The spaceport will also enhance aerospace research and development in the region.

Please accept this letter as BayTran's full support for the development of a commercial space launch site at Ellington Airport. We appreciate this opportunity to review the Environmental Assessment and offer our endorsement of the project.]

Sincerely,

A handwritten signature in cursive script that reads "Barbara Koslov".

Barbara Koslov
President, BayTran

P.O. Box 57942 • Webster, TX • 77598 • 832.771.0773 • www.baytran.org

Responses to Barbara Koslov's Comments

The FAA acknowledges your letter of support for the Houston Spaceport.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

DRAFT ENVIRONMENTAL ASSESSMENT FOR THE HOUSTON SPACEPORT
CITY OF HOUSTON, HARRIS COUNTY, TEXAS
PRIVATE COMMENTS
ON
JANUARY 22, 2015
5:30 P.M. - 8:30 P.M.
AT
SPACE CENTER HOUSTON
1601 NASA PARKWAY
SILVERMOON CONFERENCE ROOM
HOUSTON, TEXAS

	INDEX	
		Page
1		
2		
3	Comment by Theresa Rudisell.....	3
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

1 (Beginning of private comments.)

2 THERESA RUDISELL: These are in no order
3 of importance. My name is Theresa. Here you go,
4 T-h-e-r-e-s-a. Last name Rudisell, R-u-d-i-s-e-l-l.

5 I'm a homeowner. I guess it's a -- I'm
6 concerned about the quality of life for a number of
7 reasons; and as I mentioned, in not any specific order.
8 Just because I say it later doesn't mean it's of less
9 importance.

10 [Horsepen Bayou, right now in the area, is
11 already having drainage concerns with the neighboring
12 communities. That's one, drainage.] [Traffic is another
13 concern, the noise from the airport, the property
14 values, obviously. You know, I think it would be a
15 given because we do live in homes that were developed in
16 the northern section of Clear Lake. They are considered
17 the newer homes of Clear Lake; therefore, the impact to
18 our property value is going to be much greater with
19 regards to the overall perspective on property value.]

20 [I think I said air. The air quality
21 along with noise.] Really, all my concerns are what the
22 enviromental impact study has covered with regards to
23 the resources that were analyzed. The other thing is
24 there is an Alzheimer's facility that is off of Clear
25 Lake City Boulevard that is there. I don't know if

1 they're aware of this going on or not, and we already do
2 have noise issues in our section of our neighborhood
3 because of just things that are going on at the airport
4 currently.

5 I built my home. I did go to the
6 airport. I did look at traffic patterns. I did look at
7 flight patterns. I was well aware of the area building
8 and growing and it has done that for the last 18 years
9 but the advancement from Pasadena and the growth from
10 Pasadena that has occurred coupled with the new building
11 that will be going on in the back of Clear Lake off of
12 Clear Lake City Boulevard, I guess just puts traffic at
13 the forefront because of the fact that we already have a
14 lot of traffic that has come about in a very short span
15 of time.

16 So you know, as a citizen, I did my due
17 diligence before I built my home. I was told by the
18 airport administration -- they were very, very kind to
19 me. They welcomed me to call them if I ever felt like
20 anything got too loud; and, you know, in all the years
21 I've lived there, I've maybe only had to call a handful
22 of times. So it's -- you know, they've always been
23 really fantastic; and they've always been a great
24 neighbor from that aspect.

25 But bringing something like this in with

1 what the site plans look like that are on the website,
2 it's just a little concerning with regards to all of the
3 other concerns that I've mentioned.

4 That's really all I wanted to say. I
5 appreciate, you know, the opportunity to be able to come
6 out and have questions answered and be able to visit
7 with people but ultimately, a lot of them leave and go
8 back home and, you know, they're not impacted by what
9 we're going to be left with and that's my concern.

10 [Noise is already an issue and traffic is
11 already an issue and all the other things that I
12 mentioned.] I just see it escalating, and nobody knows
13 unless they live there. I'm done. Thank you.
14 Appreciate it.

15 (End of private comments.)
16
17
18
19
20
21
22
23
24
25

1 STATE OF TEXAS

2 I, Courtney Whittington, a Certified Shorthand
3 Reporter in and for the State of Texas, do hereby certify
4 that the above and foregoing contains a true and correct
5 transcription of all portions of the above-referenced
6 private comments to be included in the transcript of
7 said private comment section, and were reported by me.

8
9 Given under my hand and seal of office on the
10 9th day of February, 2015.

11
12
13
14 /S/ COURTNEY WHITTINGTON
15 COURTNEY WHITTINGTON, CSR
16 Texas CSR #9109; Expiration: 12/31/16
17 STEPHANIE MCCLURE REPORTING SERVICES
18 CRCB Firm Registration No. 130
19 607 Rustic Lane
20 Friendswood, Texas 77546
21
22
23
24
25

Responses to Theresa Rudisell's Comments

Regarding the comment about drainage, please see the response provided for Ms. Sherman's similar comment on page F-90.

Regarding the comments about traffic, as described in Section 4.14 of the Draft EA, the Proposed Action would not result in any physical changes to the surface roadway system providing access to Ellington Airport. Construction vehicles would need to travel on local roads and access Ellington Airport; however, impacts to traffic and intersections due to construction vehicles would not permanently degrade the level of service, as it would be temporary and short-term. The FAA does not anticipate any significant impacts related to traffic.

Regarding the comments about noise, please see the response provided for Ms. Sherman's similar comment on page F-89.

Regarding the comment about property values, assessing whether property values would increase or decrease as a result of establishing a spaceport at Ellington Airport is beyond the scope of the EA. The FAA cannot predict what would happen to property values should the FAA issue a license to HAS. Regarding air quality, the FAA determined the Proposed Action would not result in significant impacts. There would be no exceedance of any air quality thresholds. Refer to Section 4.1 of the EA.

This Page Intentionally Left Blank

APPENDIX G

*COORDINATION WITH THE
TEXAS GENERAL LAND OFFICE*

This Page Intentionally Left Blank



TEXAS GENERAL LAND OFFICE
GEORGE P. BUSH, COMMISSIONER

April 13, 2015

Daniel Czelusniak
Federal Aviation Administration
800 Independence Ave., SW, Suite 325
Washington, DC 20591

**Re: Texas Coastal Management Program Review of Proposed Houston Spaceport,
City of Houston, Harris County, Texas
CMP#: 15-1358-F2**

Dear Mr. Czelusniak:

Pursuant to Title 31 Natural Resources and Conservation, Part 16 Coastal Coordination Council rules, Section 506.30, the project referenced above has been reviewed for consistency with the Texas Coastal Management Program (CMP).

It has been determined that there are no significant unresolved consistency issues with respect to the project. Therefore, this project is consistent with the CMP goals and policies.

Please note that this letter does not authorize the use of Coastal Public Land. No work may be conducted or structures placed on State-owned land until you have obtained all necessary authorizations, including any required by the General Land Office and the U.S. Army Corps of Engineers.

If you have any questions or concerns, please contact me at (512) 475-3624 or at ray.newby@glo.texas.gov

Sincerely,

Ray Newby, P.G.
Coastal Geologist
Coastal Resources
Texas General Land Office

email cc: Natalie Deshatelles and David Alberts, RS&H

1700 North Congress Avenue, Austin, Texas 78701-1495
P.O. Box 12873, Austin, Texas 78711-2873
512-463-5001 glo.texas.gov

This Page Intentionally Left Blank