

The City of Durant encourages participation from all its citizens. If participation at any public meeting is not possible due to a disability, notification to the City Clerk at least 48 hours prior to the scheduled meeting is encouraged in order to make the necessary accommodations. The City of Durant may waive the 48-hour rule if interpreters for the deaf (signing) or translation services for limited English proficient (LEP) individuals are not the necessary accommodation.

DURANT AIRPORT AUTHORITY/ DAA

6:00 PM

**Roscoe J. Hatfield
Council Chambers,
Durant City Hall
AGENDA**

December 13, 2016

**DURANT CITY HALL
300 W. EVERGREEN, DURANT, OK
ROSCOE J. HATFIELD COUNCIL CHAMBERS**

CALL TO ORDER

ROLL CALL

ORDER OF BUSINESS

1. Consent Items

- a. Consider Approval of Regular Meeting Minutes for November 8, 2016

2. Consider Items Removed from Consent

3. Information Items

4. Citizen Comments on Non-Agenda Items

Citizens wishing to address the council regarding matters which are not listed on the agenda will be required to sign up no later than 5 minutes prior to the scheduled starting time of the meeting. The sign-in sheet will contain space for citizen's name, address, phone number, and topic to be discussed. In this way, city staff will be able to follow-up on any issues presented if necessary.

5. Administration

- a. Consider Approval of Amendment No. 3 to Agreement for Professional Airport Consulting Services dated February 10, 2015 Between City of Durant and LBR, Inc.
- b. Consider Approval of Request for Authorization to Purchase for Aeronautical Survey (RFAP #2016-164)

6. New Business

ADJOURNMENT

CERTIFICATE

This is to certify that in conformity with the Oklahoma Open Meeting Act, public notice of the date, time and place of this meeting was filed with the City Clerk of Durant on the 10th day of November, 2015 and that an agenda of said meeting was posted at the place of such meeting at 4:45 p.m. on the 9th day of December, 2016.

Cynthia J. Price, City of Durant



The City of Durant

Office of City Clerk

Memorandum

Date: 12/1/2016
To: Airport Authority
From: Cynthia J. Price, City Clerk
Re: Consider Approval of Regular Meeting Minutes for November 8, 2016

Council Information / Action Requested

Approval of Regular Meeting Minutes for November 8, 2016

City Staff Information / Action Follow-up, if Council authorizes this action:

ATTACHMENTS:

Description	Type	Upload Date
Minutes - 11.8.2016	Exhibit	12/7/2016

Agenda posted on Durant City Hall Entry Door at This is to certify that in conformity with the Oklahoma Open Meeting Act, public notice of the date, time and place of this meeting was filed with the City Clerk of Durant on the 10th day of November, 2015 and that an agenda of said meeting was posted at the place of such meeting at 3:40 p.m. on the 4th day of November, 2016.

**MINUTES OF THE REGULAR SCHEDULED MEETING OF DURANT AIRPORT
AUTHORITY OF November 8, 2016 AT 6:00 PM, Roscoe J. Hatfield Council
Chambers, Durant City Hall**

CALL TO ORDER

Chairman Hoffman called the meeting to order at 8:42 p.m.

ROLL CALL

Present: Trustee Chad Hitchcock	City Attorney Pat Phelps
Trustee Billy L. Orr	City Manager Tim Rundel
Trustee Jerry Tomlinson	City Clerk Cynthia J Price
Vice-Chairman Destry Hawthorne	
Chairman Stewart Hoffman	(*denotes partial attendance)

Absent: None

Chairman Hoffman declared a quorum.

1. Consent Items

To help streamline meetings and allow the focus to be on other items requiring strategic thought, the "Consent Items" portion of the agenda groups the routine, procedural, and self-explanatory non-controversial items together. These items are voted on in a single motion (one vote). However, any Council member requesting further information on a specific item thus removes it from the "Consent Items" section for individual attention and separate vote.

a. Consider Approval of Regular Meeting Minutes of October 11, 2016

Approved

Motion was made by Bill Orr and seconded by Chad Hitchcock to approve consent item as presented. Motion Passed with the following vote:

Ayes: Hawthorne, Hitchcock, Hoffman, Orr, Tomlinson

2. Consideration Items Removed from Consent

3. Citizen Comments on Non-Agenda Items

4. New Business

Adjournment

Motion was made by Chad Hitchcock and seconded by Destry Hawthorne to adjourn meeting. Motion Passed with the following vote:



The City of Durant

Office of City Clerk

Memorandum

Date: 12/8/2016
To: Airport Authority
From: Jacque Wilson, Projects Manager
Re: Consider Approval of Amendment No. 3 to Agreement for Professional Airport Consulting Services dated February 10, 2015 Between City of Durant and LBR, Inc.

This item has been included in the budget.

Council Information / Action Requested

Approval of Amendment No. 3 to Agreement for Professional Airport Consulting Services dated February 10, 2015 Between City of Durant and LBR, Inc.

City Staff Information / Action Follow-up, if Council authorizes this action:

City Clerk - Obtain required signatures and place of record.

ATTACHMENTS:

Description	Type	Upload Date
Amendment No. 3 - City of Durant/LBR, Inc.	Exhibit	12/8/2016

AMENDMENT NO. 3

This Amendment, made as of the _____ day of _____, 2016, by and between the **City of Durant** and **LBR Inc.**, shall be made a part of the Agreement for Professional Airport Consulting Services between said parties and dated February 10, 2015.

1. The following services shall be added to Section I. A. 1:
 - A. Provide an Aeronautical Survey: AGIS Design/As-Built Survey at Durant Regional Airport-Eaker Field. See Exhibit A.
2. The following fees shall be added to Section V. B. as related to the above items:
 - 1A. A fixed fee of \$ 85,400.00

In witness whereof, the parties hereto have made and executed this Amendment the day and year first written above.

LBR INC.

CITY OF DURANT

President

Mayor

ATTEST

ATTEST

Secretary

City Clerk

(Seal)

(Seal)

Certification of Legality:
Approved as to form and legality

City Attorney

Exhibit A

July 19, 2016

Please find enclosed a Scope of Work to provide ground survey, aerial photography, digital orthophotos, airspace analysis and obstruction surveys for Durant Regional Airport – Eaker Field, to the current standards listed in Federal Aviation Administration (FAA) Advisory Circulars (AC) 150/5300-16, FAA AC 150/5300-17 and FAA AC 150/5300-18.

LBR Inc. is excited to be teamed with Beacon Aviation, and Stanger Surveying, two excellent Texas-based businesses, to provide a quality proposal.

We look forward to working with Durant Regional Airport – Eaker Field, and the City of Durant, on the above described projects. If you need additional information, or have any questions, please contact us.

Sincerely,

Dave Heaton
Vice President
LBR Inc.
405.377.8276
daveh@lbrok.com
1802 W. Wright Dr.
Stillwater, OK 74075

General Qualifications



1802 W. Wright Dr., Stillwater, OK 74075. Phone: 405-377-8276 www.lbrok.com

Established in 1978, LBR Inc. has provided consulting services for nearly 250 Oklahoma airport planning and construction projects. Services have included project identification, planning, project design, construction management, and project closeout. Projects have ranged from building an airport from the ground up, to airport lighting, pavement marking, and small parking apron projects. Through our team of long term sub-consultants, LBR has provided, ground survey, aerial photography and aerial orthophotos to multiple Oklahoma airports. Although project costs have ranged from \$40,000 - \$5,000,000, LBR has approached each one with the same amount of dedication and commitment to providing a quality product. LBR Inc. has never missed a project deadline in 38 years of operation.



194 CR 2950, Alba, TX 75410 Phone: 903-768-2001 www.BeaconAviationInc.com

Incorporated in Texas, 1993, Beacon Aviation, Inc. (BAI) has successfully completed 1,000+ projects over the past 20 years, sourcing and yielding 100% digital aerial mapping deliverables, to include Ortho Mosaics, DSM, DTM, contours, planimetrics. Projects have ranged from 2,000+ sq. mile Orthos, 6" contour generation, and HD Ortho color enhanced LiDAR output. With a focus in the mining industry monthly flights over the past 228 months have been made, to capture and deliver client target areas. BAI has never failed to fly a mission or missed a deadline. BAI feels well poised to be very responsive to TxDOT's need for Digital Airport Mapping, given our extensive experience with the size and scope of projects within the mining industry, which has required BAI to capture, process and delivered as many as 15 target areas in any given month for the last two decades.



Tyler, TX 75703 Phone: 903.534.0174 www.stangercorp.com

Stanger Surveying Tyler LLC was established in April of 1987, to provide professional land surveying services in the transportation, engineering, real estate, mapping, energy and utility sectors. We are currently providing professional land surveying services in Texas and Louisiana. Our staff includes over 80 employees, including 6 Registered Professional Land Surveyors, with associated office support staff and equipment. Our clients include: oil and gas, pipeline, power and telecommunications, renewable energy, mining, engineering, construction, Texas Parks and Wildlife, multiple districts for Texas Department of Transportation, and Texas Facilities Commission.

LBR Inc. AIRPORT CONSULTANTS

1802 W. Wright Dr. - Stillwater, OK 74075 – Phone 405.377.8276 – Fax 405.377.3297

www.lbrok.com

**Jed Banks, P.E.**

President

Email: jedb@lbrok.com

- **LBR Inc.** 2003 – Present; Engineer of record
- **City of Stillwater** 1998 – 2002; Engineering Assistant, Assistant City Engineer, City Engineer, Public Works Director.
- **Manhattan Construction**
- **Mary Construction**
- **Southern Nazarene University** Bachelor of Arts Degree
- **Oklahoma State University** Bachelor of Science in Civil Engineering
- **Professional Engineer** Oklahoma P.E. No. 15081

Dave Heaton

Vice President

Email: daveh@lbrok.com

- **LBR Inc.** 1990 – Present; Design assistance, drafting, plan production, quantity computations, field and aerial survey coordination.
- **City of Stillwater** 1985 – 1997; Field survey crewmember, design assistance, drafting, plan production, quantity computations.
- **R&J Systems** 1983 – 1985; Field survey crewmember.
- **University of Central Oklahoma**
- **Oklahoma State University**

Tyler McDonald, EIT

Vice President – Secretary Treasurer

Email: tylerm@lbrok.com

- **LBR Inc.** 2007 – Present; Grant administration, project administration, computer drafting.
- **Oklahoma State University** Bachelor of Science in Industrial Engineering and Management



Key Staff - Beacon Aviation Inc.

Marty Gould

V.P., Primary PIC, 6,750 TT, Commercial Pilot Privileges: AMEL, ASEL, CFII

Email: Marty@BeaconAviationInc.com

- **Beacon Aviation, Inc.** 1993 – Present; Owner operator, chief pilot, with over 30 years of PIC, Marty is the director of day to day operations.
- **Oklahoma State University** Bachelor of Science in Business Administration, with an area of concentration in Aviation.

Jesse Gould

Flight Commander

Email: Jesse@BeaconAviationInc.com

- Beacon Aviation, Inc. 2015 – Present: Flight Crew: mission navigation, operates all of the airborne aerial mapping equipment.

Taylor Gould

Project Manager

Email: Taylor@BeaconAviationInc.com

- **Beacon Aviation, Inc.** 2010 – Present; spatial positioning, image processing, and photo interpretation/Obstruction and Change Detection Specialist.
- **The University of Texas at Tyler:** Completing senior Year of Undergraduate studies

John Salters

Email: jbsalters@gmail.com

Beacon Aviation, Inc. 2014 – Present; Pilot

- PIC, with over 20+ years of PIC experience, 5,100 TT
- ATP: AMEL, Commercial Pilot Privileges, ASEL, CFI, single, multi-engine, instrument
- A&P



Key Staff - Stanger Surveying

Joey Stanger, RPLS

President/Owner of Stanger Surveying Tyler LLC.

Email: ljs@stangercorp.com

- 43 years of experience
- Registered Professional Land Surveyor since 1979

LBR Inc. AIRPORT CONSULTANTS

1802 W. Wright Dr. - Stillwater, OK 74075 – Phone 405.377.8276 – Fax 405.377.3297

www.lbrok.com

Key Staff – Stanger Surveying – Continued

Shane Neally, RPLS

Vice President/Director of Administration

Email: shane@stangercorp.com

- 20 years of experience with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping
- Registered Professional Land Surveyor since 2000

Preston Maxfield

Vice President/Director of Operations

Email: prestonm@stangercorp.com

- 43 years of experience, 21 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Randy Nowlin, RPLS

Senior Project Manager, Licensed in Texas and Louisiana, Email: randy@stangercorp.com

- 40 years of experience, 19 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Kenny Williams, RPLS

Senior Project Manager

Licensed in Texas and Colorado

Email: kenny@stangercorp.com

- 33 years of experience, 17 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Sean Spray, RPLS

Project Manager

Licensed in Texas, Oklahoma and Kansas

Email: sean@stangercorp.com

- 13 years of experience, 7 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping
- The University of Texas at Tyler, Bachelor of Science and Technology

Robert Wedgeworth, RPLS

Project Manager

Email: robertw@stangercorp.com

- 24 years of experience
- Tyler Junior College, Associates Degree in Surveying and Mapping

LBR Inc. AIRPORT CONSULTANTS

1802 W. Wright Dr. - Stillwater, OK 74075 – Phone 405.377.8276 – Fax 405.377.3297

www.lbrok.com

Equipment and Software

LBR Inc.

- **Computer Equipment:** (3) Computer workstations, purchased in the last 12 months, (2) laptops.
- **Software:** Windows 10, 64 bit, Microsoft Office 2017, AutoCAD 2017, Autodesk Infrastructure Design Suite 2017

Beacon Aviation Inc.

- **Aircraft:** Bonanza A36, equipped with g500 synthetic vision, A/P, 200 hrs SMOH/New Prop, G430, Gami/G2. N81RJ serves as our primary remote sensing platform capable of capturing 200,000 acres at a 6" GSD, in a single day.
- **Aircraft:** Cessna 172, IFR equipped with STC'd 180hp C/S, STOL and VGs, 150 hrs SMOH. N2688U serves as a platform that safely supports remote sensing projects that require GSD as tight as 2.54cm.
- **Metric Aerial Camera:** *Phase One iXA-r*: 80mp 40mm lens.
- **Receiver:** *NovaTel SPAN-SE GNSS/INS*.
- **Inertial Measurement Unit:** *IMU-FSAS tactical grade IMU* from iMAR GmbH.
- **Custom remote sensing Flight Computer:** running NovAtel Connect and PhaseOne IX Capture.
- **Software:** Camera Calibrator, PhaseOne CaptureOne, Inertial Explorer, KLT Atlas: (2) AT, Digital Stereo Plotter, Orthomosaic, SimActive: Correlator 3D, AT, DSM, Orthomosaic, Blue Marble: (3) Global Mapper V16
- Planar SD1710 Stereo/3D Monitor

Stanger Surveying

- **Computer Equipment:** (30) Work Stations, (20) Laptops, (4) Hewlett-Packard Large Format Plotters, 42in Hewlett-Packard, Design Jet Scanner and Printer
- **Survey Equipment:** C10 Leica HDS Scan-Station, Topcon GMS-2 Submeter GPS Unit, (30) Leica Total Stations, (36) Carlson Explorer Data Collectors, (16) RTK GPS Systems, (12) Trimble Dual Frequency Static Units, (27) Metrotech Pipeline Locators.
- **Vehicles:** (20) Fully Loaded 4WD Trucks, 10 ATV's
- **Software:** Auto CAD 2016, Carlson Survey 2016, Raster Design 2010, ESRI 9.3.1 ArcInfo (soon to be updated to version 10), ArcPublisher, Adobe Pro, Leica Cyclone 7.2, CloudWorx for AutoCAD.

LBR Inc. AIRPORT CONSULTANTS

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www.lbrok.com

Processes and Methods

Processes and Methods - Step 1

Imagery Acquisition Plan; Survey and Quality Control Plan: LBR, Beacon, Stanger

An Imagery Acquisition Plan and a Survey and Quality Control Plan, will be submitted in a format compatible with the Airport Surveying – GIS Program Manager on the Airports Geographic Information System through their website (<http://airports-gis.faa.gov>). The requirements for Primary Airport Control Station (PACS), Secondary Airport Control Station(s) (SACS), and all ground control information will be defined. Any special or unusual conditions that might affect the accuracy or the approach to completion of the plans will be identified at this time. The plans will be reviewed and approved by the FAA prior to the commencement of field work.

Processes and Methods - Step 2

Obtain and submit new digital photographic data: Beacon

New color aerial digital photographic images will be obtained per standards defined in FAA AC 150/5300-17C. The process will be fully digital, and will be accomplished with the following equipment:

- Aircraft: Bonanza A36 or Cessna 172 equipped with:
- *Phase One iXA-r* Aerial Camera: 80mp 40mm lens, with event-mid-point exposure, Spann communication. Camera captures digital images, with precision External Orientation (EO) data (XYZOPK), yielding the ability to immediately generate Direct Geo-referenced Orthomosaics and 3D surfaces.
- *NovAtel SPAN-SE GNSS/INS* Receiver (X,Y,Z decimeter accuracy)
- *IMU-FSAS tactical grade Inertial Measuring Unit* from iMAR GmbH: RTK position accuracy, (m) RMS: RTK horizontal = 0.02, vertical = 0.05, Attitude Accuracy (degrees) RMS, Roll = 0.008, Pitch = 0.008, Heading = 0.023. Custom remote sensing
- Flight Computer: running NovAtel Connect and PhaseOne IX Capture.

Before BAI images are utilized, our PhaseOne metric camera goes through a rigorous in-house camera calibration process, and on each and every mission a boresight has been accomplished to ensure images and EO data is up to our stringent manufacture's specifications. Missions will be flown when seasonal full tree leaf cover is present. Altitude of capture, area of coverage, and precision will meet or exceed the airport specific requirements as defined in FAA AC 150/5300-17C. During the acquisition of aerial imagery, the onboard GNSS/INS will accurately capture altitude, latitude and longitude coordinates so the EO location of the image frame is recorded at the mid-point of image exposure/event. Simultaneously, the IMU will collect details on the attitude (pitch, yaw and roll) of the aircraft at exact time of the event. This combination of information from the NovAtel GNSS/INS and IMU is critical Exterior Orientation (EO) data used

to photogrammetric process geometrically accurate imagery, i.e. **Direct georeferencing**, which is a new method in photogrammetry, especially in the digital camera era. This method does not require ground control points (GCP) and the Aerial Triangulation (AT), to process aerial photography into ground coordinates. When Direct georeferencing is coupled with traditional aerotriangulation *methods (which will be employed per the ACs)*, it further enhances the final product(s). BAI's airborne system results in high quality imagery, meeting or exceeding *requirements defined in FAA AC 150/5300-17C, "General Guidance and Specifications for Aeronautical Survey Imagery Acquisition and Submission to the National Geodetic Survey". Resulting imagery will be submitted as directed in AC 150/5300-17C, "Standards for Using Remote Sensing Technologies in Airport Surveys"*.

Processes and Methods - Step 3

Survey: Stanger

Primary Airport Control Station (PACS), Secondary Airport Control Station(s) (SACS), and all ground control information for controlling the aerial photography, as defined in Step 2, will be established as directed in Section 2.2.2 of AC 150/5300-16A. Data will include, but is not limited to:

- Runway centerline profiles, including any stopways with elevations gathered at 50 foot intervals.
- Identify and provide coordinates for all runway ends, including displaced thresholds.
- Identify and provide coordinates for all airport existing NAVAIDS, and all NAVAIDS installed or moved during the runway extension project.

Static GPS observations will be made using Trimble model 4000 and 4800 dual channel receivers and will be post processed using Trimble Business Center software.

Real Time Kinematic (RTK) GPS observations will be made using Leica Viva GS14 systems.

All data will be tied the National Spatial Reference System (NSRS) according to the following:

- AC 150/5300-18B Standards
- AC 150/5300-16A "General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (NGS).

Processes and Methods - Step 4

Analytical Aerotriangulation: Beacon

Using proven traditional photogrammetric methods, BAI will validate the accuracy of the aerial images by extending the Airborne GPS (ABGPS)/INS, Inertial Measuring Unit (IMU), throughout the AT process utilizing ground control point information within the project capture area. Selection of the photogrammetric points for control extension will adhere to the required geometric and photogrammetric principles. The following hardware / software will be used in the aerotriangulation process: KLT Atlas: AT, Digital Stereo Plotter (DSP), SimActive: AT, DSM

Processes and Methods - Step 5

Airspace Analysis: Beacon, LBR

All airspace surfaces will be created and obstructions will be identified for all applicable surfaces, VGRPS, VGPCS, VGAS, VGPS, VGATS, VGHS, and VGCS. The analysis will be based on the airport specific requirements, both existing and planned.

Software to be used:

- Autodesk Civil 3D
 - KLT: DSP Planar: SD1710 Stereo/3D Monitor
 - SimActive: AT, DSM/DTM, LiDAR .las generation, Orthomosaic

Processes and Methods - Step 6

Digital Orthophoto Development: Beacon

- Color LiDAR mass points, along with direct imagery from the stereo model will be generated from the DSM for Obstruction Survey analysis, using KLT's Digital Stereo Plotter software and the Planar SD1710 Stereo/3D Monitor. The airspace above and within the newly generated LiDAR surface will be visually studied by a human operator in 3D mode to identify any and all Obstructions per the ACs.
- Orthophotos of the defined area will be produced. Following is the processes of pixel-by-pixel orthophoto rectification:
- Accomplish interior orientation by measuring calibrated image fiducial marks to establish a photo coordinate system.
- Accomplish exterior orientation by the aerotriangulation process. This will transform the photo coordinates to ground coordinates.
- Produce a geo-referenced orthophoto by the process of differential rectification. The image will be resampled by using a true elevation model along with the exterior orientation to correct displacement of ground features.
- Quality control. Each orthophoto is individually checked for accuracy.
- Orthophoto images will be delivered in TIF/TFW format, with full-pixel resolution, geographically referenced, and will not be re-sampled.

Project Deliverables

1. Imagery Acquisition Plan will be submitted to <http://airports-gis.faa.gov>
2. Survey and Quality Control Plan will be submitted to <http://airports-gis.faa.gov>
3. Camera Calibration Report
4. Flight Line Diagram
5. Flight Report
6. Digital Stereo Imagery in TIFF format on portable hard drive with a ground sampling distance (GSD) between 10 and 30 cm.
7. Imagery geo-referencing information.
8. Obstruction data from Airspace Analysis
9. Digital orthophotos with full pixel resolution from both altitudes of photography.
10. Final Project Report

Airport GIS Statement-of-Work

Aeronautical Survey and Airport Airspace Analysis

Administrative

Date: November 30, 2016

Prepared for: Durant Regional Airport-Eaker Field, Durant, Oklahoma

Airport Contact: Mr. Jacque J. Wilson
City Projects Manager- City of Durant
300 W. Evergreen
Durant, Oklahoma 74701
Ph: 580-931-6657
jwilson@durant.org

Mr. Aaron Walkup
GIS-Mapping- City of Durant
300 W. Evergreen
Durant, Oklahoma 74701
Ph: 580-931-6622
awalkup@durant.org

Prepared by: Mr. Tyler McDonald
LBR Inc.
Stillwater, Oklahoma 74075
Phone: 405-377-8276
tylerm@lbrok.com

Planned NTP: 12/13/16

Estimated Completion: 3/1/17

Objectives and Background

The project objective is to extend Runway 17/35 by approximately 1,200 feet to 6,200 feet and extend the parallel Taxiway A. The extension will be to the RW 35 end. An Aeronautical Survey and Airport Airspace Analysis for vertically-guided operations will be conducted to support FAA development of LPV approaches to both ends. The desired decision altitude (DA) is 250 feet with $\frac{3}{4}$ mile visibility minima. The imagery will be acquired before construction begins – approximately 1 ½ years prior to commissioning. In a future A-GIS project, the imagery will be used to map the airport to produce an electronic ALP.

Requirements

AC 150/5300-16A “General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey.”

AC 150/5300-17B “General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey.”

AC 150/5300-18B “General Guidance and Specifications for Aeronautical Surveys: Airport Survey Data Collection and Geographic Information System Standards.”

AC 150/5300-13 “Airport Design”

Data providers will make maximum use of existing data for the airport which is traceable to the source to meet the requirements of this SOW before undertaking additional data collection. Data collected or proposed for use in a project must meet the tolerances specified in the above Advisory Circulars at the 95 percent confidence level (RMSE) before being used in the project or as part of the required deliverables.

The Consultant will submit all data collected and associated required deliverables in the format(s) specified as outlined in the appropriate advisory circular to the sponsor/proponent who will ensure the data is submitted to the FAA Office of Airports, Airport Surveying-GIS Program. All data submissions to the FAA will be through the Airports-GIS website at <https://airports-gis.faa.gov/>.

The Consultant will submit weekly project status reports on the project through the program web site. The reports will contain progress updates and any significant issues with the project including deviations from the planned schedule.

The Consultant must submit, via the A-GIS website and have approved by the FAA/NGS the following required implementation plan(s) prior to commencing fieldwork.

Imagery
 Survey and Quality Control

The Consultant will submit final report for each plan as required in respective advisory circular.

The consultant will coordinate with the Airport Traffic Control Tower (ATCT) Management for the flight mission and access to the ATCT and FAA Technical Operations for access to NAVAID facilities.

Geodetic Control

This project will use existing PACS01, SAC01 and SAC02. If existing PACS/SACS are determined to be damaged the project will establish temporary geodetic control as required. Geodetic data will be tied to the National Spatial Reference System.

Imagery

Per AC 5300-17B, imagery will show full leaf coverage.

Digital Metric Camera: True Color

The following Flight Missions will be performed:

<u>Flying Height</u>	<u>Area</u>	<u>Photo scale</u>	<u>Ground Sample Distance</u>
3,972' AGL	A/B	1" = 600'	6 inch

Area A – Entire project area to include all Object Identification Surfaces (OIS) as defined in AC 150/530018B, Sections 2.7.1.1.

Area B – All Airport Property including 6,000' off both ends of Runway 17/35 (VGPS) with 1,200-foot ext.

Orthorectified imagery will be submitted for both flight missions.

Deliver data and information to NGS per 150/5300-17C, Paragraph 7.1, 7.2.

Data will be delivered to FAA per 150/5300-17C, Paragraph 7.1, 7.2

Survey and Quality Control

The Obstruction Survey will collect all attributes for safety-critical features. AC 150/5300-18B, Table 2-1, Column Instrument Procedure Development was used as a guide.

Conduct Airport Survey and Analysis:

Runway 17/35 in accordance with runways with Vertical Guidance (-18B, Section 2.7.1)

Validate Runway end position and elevation against existing FAA/NGS data:

Runway 17/35

Validate the following electronic and visual on airport NAVAIDS:

RW 17 REILS, PAPI

RW 35 REILS, PAPI

Validate the following off airport NAVAIDS:

N/A

Collect the following runway Profiles:

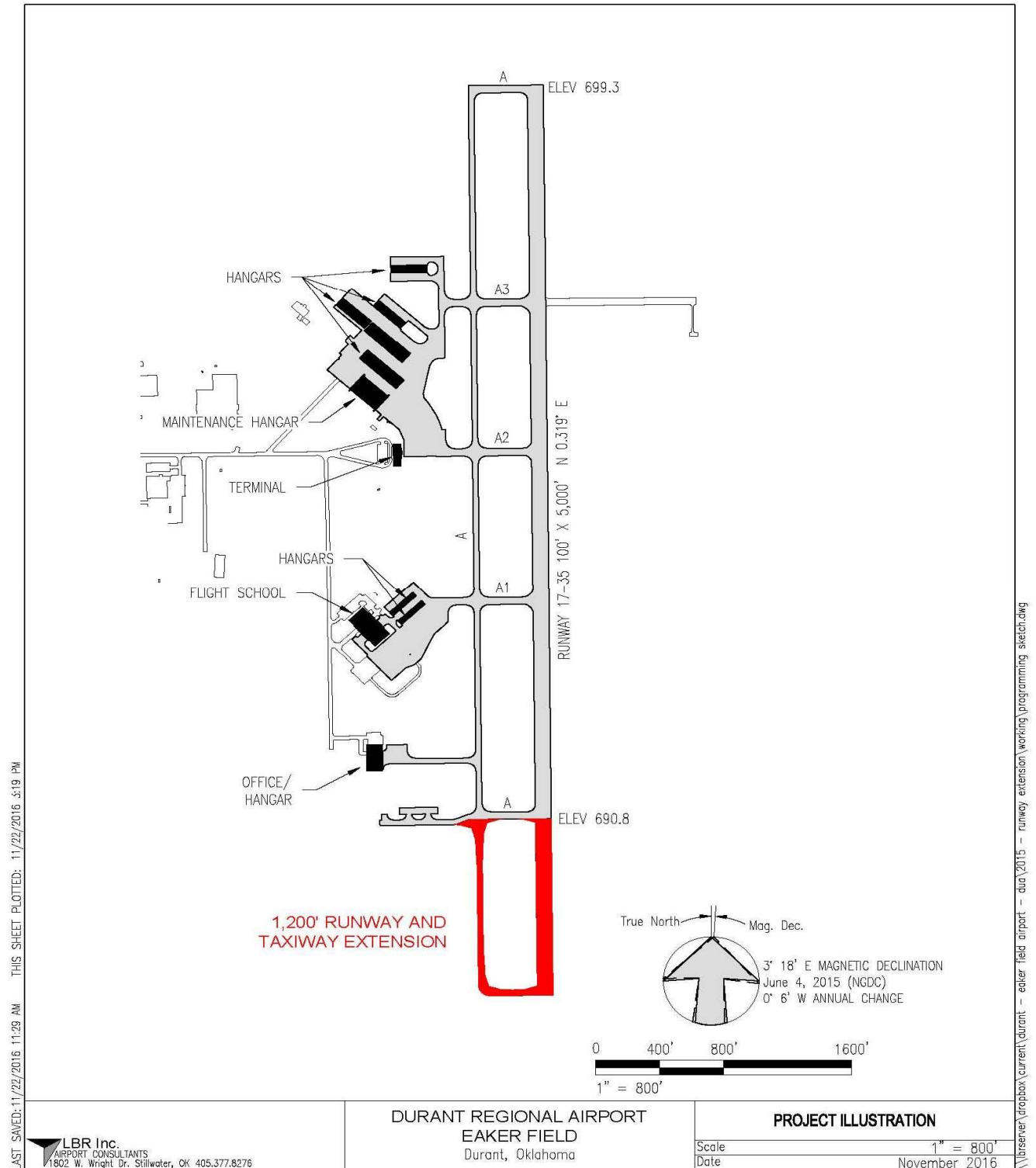
Runway 17/35 Centerline and 10-foot centerline offsets at 10-foot stations

Develop 1-foot elevation contours for entire airport

Validate Airport Elevation

Validate/Determine Airport Reference Point

Submit planned Runway 17/35 centerline extension profile at 10-foot stations and proposed Runway 35 end latitude, longitude and elevation, then after runway has been constructed validate plan data and submit actual values to FAA via AGIS Website.

Illustration

LBR Inc. AIRPORT CONSULTANTS

1802 W. Wright Dr. - Stillwater, OK 74075 – Phone 405.377.8276 – Fax 405.377.3297

www.lbrok.com

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References:



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Airport Manager, Ponca City Regional Airport - Box 1450, Ponca City, OK 74602

Gary Johnson 405.372.7881

Airport Manager, Stillwater Regional Airport – 2020-1 W. Airport Rd., Stillwater, OK 74075

Ronny Nelson 405.372.7881

Airport Manager, David Jay Perry Airport – 100 E. Center Road, Goldsby, OK 73093

Mark Worthley 405.542.3103

Airport Board Member, Town of Hinton – PO Box 1038, Hinton, OK 73047

Beacon Aviation Inc.

Mr. Wayne Collins 903-768-2611

Original Chairman of the Board: KJDD, named by TxDOT Aviation, 2008 Texas Aviator of the Yr
1053 N. Johnson, Mineola, Tx 75773

Charlie Carrigan 903-626-6343

Production Planning Supervisor, Texas Westmoreland Coal Co. - Email:
CCarrigan@westmoreland.com

John Semken 318-871-3806

Supt-Mine Engineering, Dolet Hills Lignite Company – Email: jjsemken@aep.com

Charles E. Ettinger, PE 903-668-5542

Staff Engineer, North American Coal Corporation, Sabine Mine - 6501 Farm Rd 968 West,
Hallsville, TX 75650



Ted Pittinger 903-510-9141

District Survey Coordinator – Texas Department of Transportation - 2709 West Front St.
Tyler, Tx. 75702

Charles E. Ettinger, PE 903-668-5542

Staff Engineer, North American Coal Corporation, Sabine Mine - 6501 Farm Rd 968 West,
Hallsville, TX 75650

LBR Inc. AIRPORT CONSULTANTS

1802 W. Wright Dr. - Stillwater, OK 74075 – Phone 405.377.8276 – Fax 405.377.3297

www.lbrok.com

Reference Projects

McAlester Regional Airport, McAlester, Oklahoma

2015 – Obstruction survey following safety area grading project.

Sub Consultant:

Aerial Data Service, Inc.

8301 East 51st Street, Suite 100

Tulsa, OK 74145-9046

918.622.4144 800.888.9163



The City of Durant

Office of City Clerk

Memorandum

Date: 12/9/2016
To: Airport Authority
From: Jacque Wilson, Projects Manager
Re: Consider Approval of Request for Authorization to Purchase for Aeronautical Survey (RFAP #2016-164)

Council Information / Action Requested

Approval of Request for Authorization to Purchase for Aeronautical Survey (RFAP #2016-164) to LBR Inc. Airport Consultants in the amount of \$85,400.

City Staff Information / Action Follow-up, if Council authorizes this action:

ATTACHMENTS:

Description	Type	Upload Date
RFAP #2016-164	Exhibit	12/9/2016

SPEND/CNTRCT#

INCODE PROJ#

RFAP#2016-164**REQUEST FOR AUTHORIZATION TO PURCHASE**

Ref: 11 O.S. §10:114 (B) and 61 O.S. §103 (D) and & City of Durant Code: § 37.003-37.010

Item #

- 1 Item planned for spending (provide details):
AERONAUTICAL SURVEY
- 2 Department requesting authorization:
EAKER FIELD AIRPORT
- 3 Bidding recommendation (award or reject along with name and contact information of vendor):
LBR INC. AIRPORT CONSULTANTS
- 4 Estimated Purchase Date (M/D/Y): August 29, 2016
- 5 What are the financing or lease purchase terms (APR %, length of financing, payments, etc.)
- 6 Is this item included in the current FY budget (Yes/No) Yes
- 7 GL account code: #015-605-503-80-35
- 8 Spending / purchase request details (complete below blanks):

8a Amount requested to spend	<u>\$85,400.00</u>
8b Item (new or replacement, if a capital item complete fixed asset form)?	<u>New</u>
8c Old Item to be Traded-In (Yes / No). Note: if a capital item complete fixed asset form?	<u>No</u>
- If a Replacement Item, give description, age and condition of item to be replaced (including model & serial or VIN, trade allowance)*
- 8d Is a contractor written agreement involved (Yes / No), if yes include a copy of the contract after City Attorney Review Yes
- 8e Does the purchase involve Grant Funding (Yes or No) FAA - OAC Yes
- 8f What is the City Cash Match for the Grant \$21,539.00
- 8g What other match or financial obligation is involved with the City accepting this Grant (explain with details)
- 9 Purchase is Planned By (complete appropriate item(s) below):
 - 9a **Informal Quotes** – Purchases of \$2000-\$15,000 City Manager approval required. Purchases with an estimated cost over \$15,000 use formal bids. Specifications & at least 3 quotes must be attached for items over \$5,000 (city manager can require quotes for below \$5,000):
 - 9b **Formal Bids** – Purchases with an estimated cost over \$15,000 Council approval required. Attach complete specifications and a bidders list with at least 3 bidders. Include bidder name, address, phone number, fax number and email address of recommended vendor:
 - 9c **State Contract** – Purchases of \$2,000-\$15,000 City Manager approval required. Purchases over \$15,000 Council approval required. Include name, address, phone number, fax number, email address of state contract vendor and state contract number:

9d **Buy Board** – Purchases of \$2,000-\$15,000 City Manager approval required. Purchases more than \$15,000 Council approval required. Include name, address, phone number, fax number, email address of Buy Board:

9e **Professional Services Agreement** – Purchases over \$2,000 and less than \$15,000 via an engineering, surveying, architect, computer services, janitorial, etc. firm covered by a council approved professional services agreement, City Manager approval required.

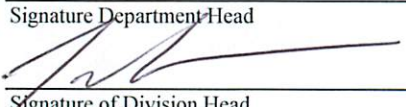
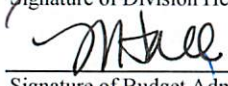
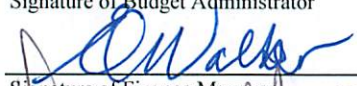
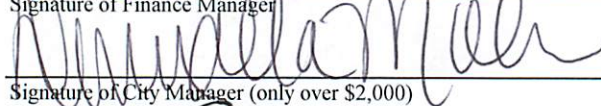
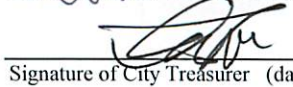
PROVIDE AN AERONAUTICAL SURVEY: AGIS DESIGN/AS-BUILT SURVEY AT DURANT REGIONAL AIRPORT-EAKER FIELD.

SEE EXHIBIT A

9f **Emergency Purchase** – To be utilized only when immediate action must be taken to protect the public health or safety or to prevent damage to property, prior council approval not required. Notify the City Manager immediately that an emergency purchase is needed.

9g **Sole Source Purchase** – Purchases of \$2,000-\$15,000 City Manager approval required. Purchases with an estimated cost over \$15,000 Council approval required in addition to City Manager approval. Attach to this request a memo detailing the nature of the Sole source designation, that is explain how this purchase fulfills the requirements to be considered a sole source purchase:

10 Signature & date blocks (complete appropriate sections):

10a	Signature of Grants Administrator (if applicable)		8-29-16
			date (M/D/Y):
10b	Signature Department Head		8-29-16
			date (M/D/Y):
10c	Signature of Division Head		8-29-16
			date (M/D/Y):
10d	Signature of Budget Administrator		8/29/16
			date (M/D/Y):
10e	Signature of Finance Manager		8-29-16
			date (M/D/Y):
10f	Signature of City Manager (only over \$2,000)		8-29-2016
			date (M/D/Y):
10g	Signature of City Treasurer (date)		
			date (M/D/Y):
11h	City Manager Comments:		

AMENDMENT NO. 3

This Amendment, made as of the _____ day of _____, 2016, by and between the **City of Durant** and **LBR Inc.**, shall be made a part of the Agreement for Professional Airport Consulting Services between said parties and dated February 10, 2015.

1. The following services shall be added to Section I. A. 1:
 - A. Provide an Aeronautical Survey: AGIS Design/As-Built Survey at Durant Regional Airport-Eaker Field. See Exhibit A.

2. The following fees shall be added to Section V. B. as related to the above items:
 - 1A. A fixed fee of \$ 85,400.00

In witness whereof, the parties hereto have made and executed this Amendment the day and year first written above.

LBR INC.

CITY OF DURANT

President

Mayor

ATTEST

ATTEST

Secretary

City Clerk

(Seal)

(Seal)

Certification of Legality:
Approved as to form and legality

City Attorney

Exhibit A

July 19, 2016

Please find enclosed a Scope of Work to provide ground survey, aerial photography, digital orthophotos, airspace analysis and obstruction surveys for Durant Regional Airport – Eaker Field, to the current standards listed in Federal Aviation Administration (FAA) Advisory Circulars (AC) 150/5300-16, FAA AC 150/5300-17 and FAA AC 150/5300-18.

LBR Inc. is excited to be teamed with Beacon Aviation, and Stanger Surveying, two excellent Texas-based businesses, to provide a quality proposal.

We look forward to working with Durant Regional Airport – Eaker Field, and the City of Durant, on the above described projects. If you need additional information, or have any questions, please contact us.

Sincerely,

Dave Heaton
Vice President
LBR Inc.
405.377.8276
daveh@lbrok.com
1802 W. Wright Dr.
Stillwater, OK 74075

General Qualifications

LBR Inc.

1802 W. Wright Dr., Stillwater, OK 74075. Phone: 405-377-8276 www.lbrok.com

Established in 1978, LBR Inc. has provided consulting services for nearly 250 Oklahoma airport planning and construction projects. Services have included project identification, planning, project design, construction management, and project closeout. Projects have ranged from building an airport from the ground up, to airport lighting, pavement marking, and small parking apron projects. Through our team of long term sub-consultants, LBR has provided, ground survey, aerial photography and aerial orthophotos to multiple Oklahoma airports. Although project costs have ranged from \$40,000 - \$5,000,000, LBR has approached each one with the same amount of dedication and commitment to providing a quality product. LBR Inc. has never missed a project deadline in 38 years of operation.

Beacon Aviation Inc.

194 CR 2950, Alba, TX 75410 Phone: 903-768-2001 www.BeaconAviationInc.com

Incorporated in Texas, 1993, Beacon Aviation, Inc. (BAI) has successfully completed 1,000+ projects over the past 20 years, sourcing and yielding 100% digital aerial mapping deliverables, to include Ortho Mosaics, DSM, DTM, contours, planimetrics. Projects have ranged from 2,000+ sq. mile Orthos, 6" contour generation, and HD Ortho color enhanced LiDAR output. With a focus in the mining industry monthly flights over the past 228 months have been made, to capture and deliver client target areas. BAI has never failed to fly a mission or missed a deadline. BAI feels well poised to be very responsive to TxDOT's need for Digital Airport Mapping, given our extensive experience with the size and scope of projects within the mining industry, which has required BAI to capture, process and delivered as many as 15 target areas in any given month for the last two decades.

Stanger Surveying

Tyler, TX 75703 Phone: 903.534.0174 www.stangercorp.com

Stanger Surveying Tyler LLC was established in April of 1987, to provide professional land surveying services in the transportation, engineering, real estate, mapping, energy and utility sectors. We are currently providing professional land surveying services in Texas and Louisiana. Our staff includes over 80 employees, including 6 Registered Professional Land Surveyors, with associated office support staff and equipment. Our clients include: oil and gas, pipeline, power and telecommunications, renewable energy, mining, engineering, construction, Texas Parks and Wildlife, multiple districts for Texas Department of Transportation, and Texas Facilities Commission.

LBR Inc. AIRPORT CONSULTANTS

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 LBR Inc. Key Staff – LBR Inc.
Airport Consultants

Jed Banks, P.E.

President

Email: jedb@lbrok.com

- **LBR Inc.** 2003 – Present; Engineer of record
- **City of Stillwater** 1998 – 2002; Engineering Assistant, Assistant City Engineer, City Engineer, Public Works Director.
- **Manhattan Construction**
- **Mary Construction**
- **Southern Nazarene University** Bachelor of Arts Degree
- **Oklahoma State University** Bachelor of Science in Civil Engineering
- **Professional Engineer** Oklahoma P.E. No. 15081

Dave Heaton

Vice President

Email: daveh@lbrok.com

- **LBR Inc.** 1990 – Present; Design assistance, drafting, plan production, quantity computations, field and aerial survey coordination.
- **City of Stillwater** 1985 – 1997; Field survey crewmember, design assistance, drafting, plan production, quantity computations.
- **R&J Systems** 1983 – 1985; Field survey crewmember.
- **University of Central Oklahoma**
- **Oklahoma State University**

Tyler McDonald, EIT

Vice President – Secretary Treasurer

Email: tylerm@lbrok.com

- **LBR Inc.** 2007 – Present; Grant administration, project administration, computer drafting.
- **Oklahoma State University** Bachelor of Science in Industrial Engineering and Management

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Key Staff - Beacon Aviation Inc.

Marty Gould

V.P., Primary PIC, 6,750 TT, Commercial Pilot Privileges: AMEL, ASEL, CFII

Email: Marty@BeaconAviationInc.com

- **Beacon Aviation, Inc.** 1993 – Present; Owner operator, chief pilot, with over 30 years of PIC, Marty is the director of day to day operations.
- **Oklahoma State University** Bachelor of Science in Business Administration, with an area of concentration in Aviation.

Jesse Gould

Flight Commander

Email: Jesse@BeaconAviationInc.com

- **Beacon Aviation, Inc.** 2015 – Present: Flight Crew: mission navigation, operates all of the airborne aerial mapping equipment.

Taylor Gould

Project Manager

Email: Taylor@BeaconAviationInc.com

- **Beacon Aviation, Inc.** 2010 – Present; spatial positioning, image processing, and photo interpretation/Obstruction and Change Detection Specialist.
- **The University of Texas at Tyler:** Completing senior Year of Undergraduate studies

John Salters

Email: jbsalters@gmail.com

Beacon Aviation, Inc. 2014 – Present; Pilot

- PIC, with over 20+ years of PIC experience, 5,100 TT
- ATP: AMEL, Commercial Pilot Privileges, ASEL, CFI, single, multi-engine, instrument
- A&P



Key Staff - Stanger Surveying

Joey Stanger, RPLS

President/Owner of Stanger Surveying Tyler LLC.

Email: ljs@stangercorp.com

- 43 years of experience
- Registered Professional Land Surveyor since 1979

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Key Staff – Stanger Surveying – Continued

Shane Neally, RPLS

Vice President/Director of Administration

Email: shane@stangercorp.com

- 20 years of experience with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping
- Registered Professional Land Surveyor since 2000

Preston Maxfield

Vice President/Director of Operations

Email: prestonm@stangercorp.com

- 43 years of experience, 21 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Randy Nowlin, RPLS

Senior Project Manager, Licensed in Texas and Louisiana, Email: randy@stangercorp.com

- 40 years of experience, 19 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Kenny Williams, RPLS

Senior Project Manager

Licensed in Texas and Colorado

Email: kenny@stangercorp.com

- 33 years of experience, 17 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping

Sean Spray, RPLS

Project Manager

Licensed in Texas, Oklahoma and Kansas

Email: sean@stangercorp.com

- 13 years of experience, 7 years with Stanger Surveying
- Tyler Junior College, Associates Degree in Surveying and Mapping
- The University of Texas at Tyler, Bachelor of Science and Technology

Robert Wedgeworth, RPLS

Project Manager

Email: robertw@stangercorp.com

- 24 years of experience
- Tyler Junior College, Associates Degree in Surveying and Mapping

LBR Inc. AIRPORT CONSULTANTS

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Equipment and Software

LBR Inc.

- **Computer Equipment:** (3) Computer workstations, purchased in the last 12 months, (2) laptops.
- **Software:** Windows 10, 64 bit, Microsoft Office 2017, AutoCAD 2017, Autodesk Infrastructure Design Suite 2017

Beacon Aviation Inc.

- **Aircraft:** Bonanza A36, equipped with g500 synthetic vision, A/P, 200 hrs SMOH/New Prop, G430, Gami/G2. N81RJ serves as our primary remote sensing platform capable of capturing 200,000 acres at a 6" GSD, in a single day.
- **Aircraft:** Cessna 172, IFR equipped with STC'd 180hp C/S, STOL and VGs, 150 hrs SMOH. N2688U serves as a platform that safely supports remote sensing projects that require GSD as tight as 2.54cm.
- **Metric Aerial Camera:** *Phase One iXA-r*: 80mp 40mm lens.
- **Receiver:** *NovaTel SPAN-SE GNSS/INS*.
- **Inertial Measurement Unit:** *IMU-FSAS tactical grade IMU* from iMAR GmbH.
- **Custom remote sensing Flight Computer:** running NovAtel Connect and PhaseOne IX Capture.
- **Software:** Camera Calibrator, PhaseOne CaptureOne, Inertial Explorer, KLT Atlas: (2) AT, Digital Stereo Plotter, Orthomosaic, SimActive: Correlator 3D, AT, DSM, Orthomosaic, Blue Marble: (3) Global Mapper V16
- Planar SD1710 Stereo/3D Monitor

Stanger Surveying

- **Computer Equipment:** (30) Work Stations, (20) Laptops, (4) Hewlett-Packard Large Format Plotters, 42in Hewlett-Packard, Design Jet Scanner and Printer
- **Survey Equipment:** C10 Leica HDS Scan-Station, Topcon GMS-2 Submeter GPS Unit, (30) Leica Total Stations, (36) Carlson Explorer Data Collectors, (16) RTK GPS Systems, (12) Trimble Dual Frequency Static Units, (27) Metrotech Pipeline Locators.
- **Vehicles:** (20) Fully Loaded 4WD Trucks, 10 ATV's
- **Software:** Auto CAD 2016, Carlson Survey 2016, Raster Design 2010, ESRI 9.3.1 ArcInfo (soon to be updated to version 10), ArcPublisher, Adobe Pro, Leica Cyclone 7.2, CloudWorx for AutoCAD.

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Processes and Methods

Processes and Methods - Step 1

Imagery Acquisition Plan; Survey and Quality Control Plan: LBR, Beacon, Stanger

An Imagery Acquisition Plan and a Survey and Quality Control Plan, will be submitted in a format compatible with the Airport Surveying – GIS Program Manager on the Airports Geographic Information System through their website (<http://airports-gis.faa.gov>). The requirements for Primary Airport Control Station (PACS), Secondary Airport Control Station(s) (SACS), and all ground control information will be defined. Any special or unusual conditions that might affect the accuracy or the approach to completion of the plans will be identified at this time. The plans will be reviewed and approved by the FAA prior to the commencement of field work.

Processes and Methods - Step 2

Obtain and submit new digital photographic data: Beacon

New color aerial digital photographic images will be obtained per standards defined in FAA AC 150/5300-17C. The process will be fully digital, and will be accomplished with the following equipment:

- Aircraft: Bonanza A36 or Cessna 172 equipped with:
- *Phase One iXA-r* Aerial Camera: 80mp 40mm lens, with event-mid-point exposure, Spann communication. Camera captures digital images, with precision External Orientation (EO) data (XYZOPK), yielding the ability to immediately generate Direct Geo-referenced Orthomosaics and 3D surfaces.
- *NovAtel SPAN-SE GNSS/INS* Receiver (X,Y,Z decimeter accuracy)
- *IMU-FSAS tactical grade Inertial Measuring Unit* from iMAR GmbH: RTK position accuracy, (m) RMS: RTK horizontal = 0.02, vertical = 0.05, Attitude Accuracy (degrees) RMS, Roll = 0.008, Pitch = 0.008, Heading = 0.023. Custom remote sensing
- Flight Computer: running NovAtel Connect and PhaseOne IX Capture.

Before BAI images are utilized, our PhaseOne metric camera goes through a rigorous in-house camera calibration process, and on each and every mission a boresight has been accomplished to ensure images and EO data is up to our stringent manufacture's specifications. Missions will be flown when seasonal full tree leaf cover is present. Altitude of capture, area of coverage, and precision will meet or exceed the airport specific requirements as defined in FAA AC 150/5300-17C. During the acquisition of aerial imagery, the onboard GNSS/INS will accurately capture altitude, latitude and longitude coordinates so the EO location of the image frame is recorded at the mid-point of image exposure/event. Simultaneously, the IMU will collect details on the attitude (pitch, yaw and roll) of the aircraft at exact time of the event. This combination of information from the NovAtel GNSS/INS and IMU is critical Exterior Orientation (EO) data used

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to photogrammetric process geometrically accurate imagery, i.e. **Direct georeferencing**, which is a new method in photogrammetry, especially in the digital camera era. This method does not require ground control points (GCP) and the Aerial Triangulation (AT), to process aerial photography into ground coordinates. When Direct georeferencing is coupled with traditional aerotriangulation *methods (which will be employed per the ACs)*, it further enhances the final product(s). BAI's airborne system results in high quality imagery, meeting or exceeding *requirements defined in FAA AC 150/5300-17C, "General Guidance and Specifications for Aeronautical Survey Imagery Acquisition and Submission to the National Geodetic Survey". Resulting imagery will be submitted as directed in AC 150/5300-17C, "Standards for Using Remote Sensing Technologies in Airport Surveys"*.

Processes and Methods - Step 3

Survey: Stanger

Primary Airport Control Station (PACS), Secondary Airport Control Station(s) (SACS), and all ground control information for controlling the aerial photography, as defined in Step 2, will be established as directed in Section 2.2.2 of AC 150/5300-16A. Data will include, but is not limited to:

- Runway centerline profiles, including any stopways with elevations gathered at 50 foot intervals.
- Identify and provide coordinates for all runway ends, including displaced thresholds.
- Identify and provide coordinates for all airport existing NAVAIDS, and all NAVAIDS installed or moved during the runway extension project.

Static GPS observations will be made using Trimble model 4000 and 4800 dual channel receivers and will be post processed using Trimble Business Center software.

Real Time Kinematic (RTK) GPS observations will be made using Leica Viva GS14 systems.

All data will be tied the National Spatial Reference System (NSRS) according to the following:

- AC 150/5300-18B Standards
- AC 150/5300-16A "General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (NGS).

Processes and Methods - Step 4

Analytical Aerotriangulation: Beacon

Using proven traditional photogrammetric methods, BAI will validate the accuracy of the aerial images by extending the Airborne GPS (ABGPS)/INS, Inertial Measuring Unit (IMU), throughout the AT process utilizing ground control point information within the project capture area. Selection of the photogrammetric points for control extension will adhere to the required geometric and photogrammetric principles. The following hardware / software will be used in the aerotriangulation process: KLT Atlas: AT, Digital Stereo Plotter (DSP), SimActive: AT, DSM

Processes and Methods - Step 5

Airspace Analysis: Beacon, LBR

All airspace surfaces will be created and obstructions will be identified for all applicable surfaces, VGRPS, VGPCS, VGAS, VGPS, VGATS, VGHS, and VGCS. The analysis will be based on the airport specific requirements, both existing and planned.

Software to be used:

- Autodesk Civil 3D
 - KLT: DSP Planar: SD1710 Stereo/3D Monitor
 - SimActive: AT, DSM/DTM, LiDAR .las generation, Orthomosaic

Processes and Methods - Step 6

Digital Orthophoto Development: Beacon

- Color LiDAR mass points, along with direct imagery from the stereo model will be generated from the DSM for Obstruction Survey analysis, using KLT's Digital Stereo Plotter software and the Planar SD1710 Stereo/3D Monitor. The airspace above and within the newly generated LiDAR surface will be visually studied by a human operator in 3D mode to identify any and all Obstructions per the ACs.
- Orthophotos of the defined area will be produced. Following is the processes of pixel-by-pixel orthophoto rectification:
- Accomplish interior orientation by measuring calibrated image fiducial marks to establish a photo coordinate system.
- Accomplish exterior orientation by the aerotriangulation process. This will transform the photo coordinates to ground coordinates.
- Produce a geo-referenced orthophoto by the process of differential rectification. The image will be resampled by using a true elevation model along with the exterior orientation to correct displacement of ground features.
- Quality control. Each orthophoto is individually checked for accuracy.
- Orthophoto images will be delivered in TIF/TFW format, with full-pixel resolution, geographically referenced, and will not be re-sampled.

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Project Deliverables

1. Imagery Acquisition Plan will be submitted to <http://airports-gis.faa.gov>
2. Survey and Quality Control Plan will be submitted to <http://airports-gis.faa.gov>
3. Camera Calibration Report
4. Flight Line Diagram
5. Flight Report
6. Digital Stereo Imagery in TIFF format on portable hard drive with a ground sampling distance (GSD) between 10 and 30 cm.
7. Imagery geo-referencing information.
8. Obstruction data from Airspace Analysis
9. Digital orthophotos with full pixel resolution from both altitudes of photography.
10. Final Project Report

Airport GIS Statement-of-Work

Aeronautical Survey and Airport Airspace Analysis

Administrative

Date: November 30, 2016

Prepared for: Durant Regional Airport-Eaker Field, Durant, Oklahoma

Airport Contact: Mr. Jacque J. Wilson
City Projects Manager- City of Durant
300 W. Evergreen
Durant, Oklahoma 74701
Ph: 580-931-6657
jwilson@durant.org

Mr. Aaron Walkup
GIS-Mapping- City of Durant
300 W. Evergreen
Durant, Oklahoma 74701
Ph: 580-931-6622
awalkup@durant.org

Prepared by: Mr. Tyler McDonald
LBR Inc.
Stillwater, Oklahoma 74075
Phone: 405-377-8276
tylerm@lbrok.com

Planned NTP: 12/13/16

Estimated Completion: 3/1/17

Objectives and Background

The project objective is to extend Runway 17/35 by approximately 1,200 feet to 6,200 feet and extend the parallel Taxiway A. The extension will be to the RW 35 end. An Aeronautical Survey and Airport Airspace Analysis for vertically-guided operations will be conducted to support FAA development of LPV approaches to both ends. The desired decision altitude (DA) is 250 feet with $\frac{3}{4}$ mile visibility minima. The imagery will be acquired before construction begins – approximately 1 $\frac{1}{2}$ years prior to commissioning. In a future A-GIS project, the imagery will be used to map the airport to produce an electronic ALP.

Requirements

AC 150/5300-16A "General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey."

AC 150/5300-17B "General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey."

AC 150/5300-18B "General Guidance and Specifications for Aeronautical Surveys: Airport Survey Data Collection and Geographic Information System Standards."

AC 150/5300-13 "Airport Design"

Data providers will make maximum use of existing data for the airport which is traceable to the source to meet the requirements of this SOW before undertaking additional data collection. Data collected or proposed for use in a project must meet the tolerances specified in the above Advisory Circulars at the 95 percent confidence level (RMSE) before being used in the project or as part of the required deliverables.

The Consultant will submit all data collected and associated required deliverables in the format(s) specified as outlined in the appropriate advisory circular to the sponsor/proponent who will ensure the data is submitted to the FAA Office of Airports, Airport Surveying-GIS Program. All data submissions to the FAA will be through the Airports-GIS website at <https://airports-gis.faa.gov/>.

The Consultant will submit weekly project status reports on the project through the program web site. The reports will contain progress updates and any significant issues with the project including deviations from the planned schedule.

LBR Inc. AIRPORT CONSULTANTS

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The Consultant must submit, via the A-GIS website and have approved by the FAA/NGS the following required implementation plan(s) prior to commencing fieldwork.

Imagery
Survey and Quality Control

The Consultant will submit final report for each plan as required in respective advisory circular.

The consultant will coordinate with the Airport Traffic Control Tower (ATCT) Management for the flight mission and access to the ATCT and FAA Technical Operations for access to NAVAID facilities.

Geodetic Control

This project will use existing PACS01, SAC01 and SAC02. If existing PACS/SACS are determined to be damaged the project will establish temporary geodetic control as required. Geodetic data will be tied to the National Spatial Reference System.

Imagery

Per AC 5300-17B, imagery will show full leaf coverage.

Digital Metric Camera: True Color

The following Flight Missions will be performed:

<u>Flying Height</u>	<u>Area</u>	<u>Photo scale</u>	<u>Ground Sample Distance</u>
3,972' AGL	A/B	1" = 600'	6 inch

Area A – Entire project area to include all Object Identification Surfaces (OIS) as defined in AC 150/530018B, Sections 2.7.1.1.

Area B – All Airport Property including 6,000' off both ends of Runway 17/35 (VGPS) with 1,200-foot ext.

Orthorectified imagery will be submitted for both flight missions.

Deliver data and information to NGS per 150/5300-17C, Paragraph 7.1, 7.2.

Data will be delivered to FAA per 150/5300-17C, Paragraph 7.1, 7.2

Survey and Quality Control

The Obstruction Survey will collect all attributes for safety-critical features. AC 150/5300-18B, Table 2-1, Column Instrument Procedure Development was used as a guide.

Conduct Airport Survey and Analysis:

Runway 17/35 in accordance with runways with Vertical Guidance (-18B, Section 2.7.1)

Validate Runway end position and elevation against existing FAA/NGS data:

Runway 17/35

Validate the following electronic and visual on airport NAVAIDS:

RW 17 REILS, PAPI

RW 35 REILS, PAPI

Validate the following off airport NAVAIDS:

N/A

Collect the following runway Profiles:

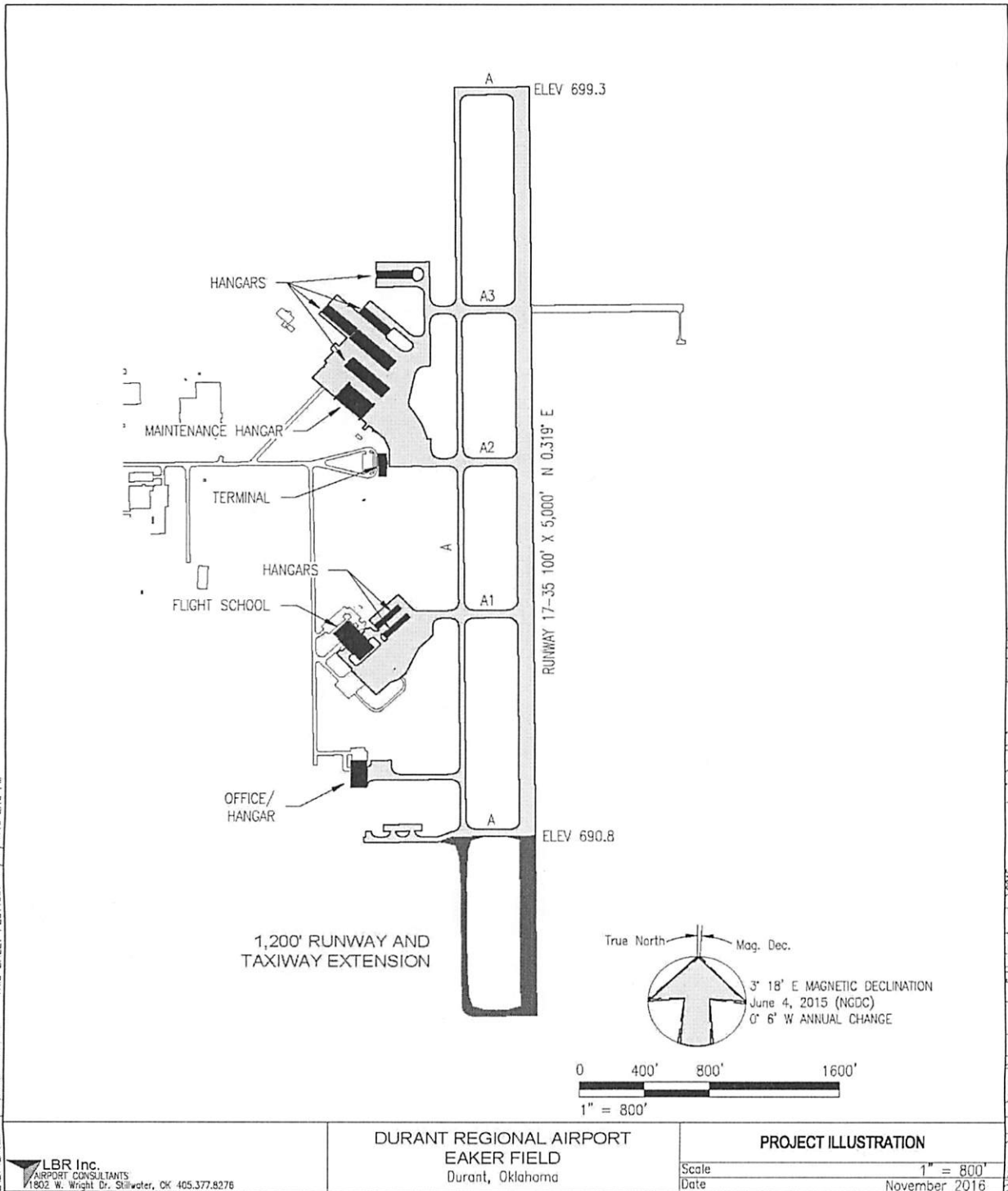
Runway 17/35 Centerline and 10-foot centerline offsets at 10-foot stations

Develop 1-foot elevation contours for entire airport

Validate Airport Elevation

Validate/Determine Airport Reference Point

Submit planned Runway 17/35 centerline extension profile at 10-foot stations and proposed Runway 35 end latitude, longitude and elevation, then after runway has been constructed validate plan data and submit actual values to FAA via AGIS Website.

Illustration
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