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Crossville Memorial Airport – Whitson Field (CSV)

Work Authorization Number [Enter WA Number]

Airport Layout Plan and Narrative Report

Date _____

TAD Project No. _____

Atkins No. _____
(Project Identification No.)

It is agreed to undertake the following work in accordance with the provisions of the Professional Airport Services Agreement between the City of Crossville (OWNER) and Atkins North America, Inc. (ENGINEER) dated the 13th day of June 2019.

SCOPE OF SERVICES:

The ENGINEER shall provide professional services for the development of an Airport Layout Plan and Narrative Report (the PROJECT) for the Crossville Memorial Airport – Whitson Field (CSV). The Scope of ENGINEER's services are more particularly described in Attachment A and made a part of this Work Authorization.

TIME OF PERFORMANCE:

The services of the ENGINEER under this Work Authorization shall be completed within the time allotted by TDOT and based on the grant expiration date of the 5th day of September 2022. In conducting the project, the ENGINEER shall keep the OWNER informed as to the status, anticipated activities, schedule changes, and any known problem areas. The OWNER may grant extensions of time to the ENGINEER for the performance and completion of services and work under this Work Authorization if there are delays due to circumstances reasonably beyond the control of the ENGINEER and at the approval of TDOT. The schedule of ENGINEER's services are more particularly described in Attachment A and made a part of this Work Authorization.

COMPENSATION:

The OWNER shall compensate the ENGINEER under the herein described Scope of Services a Lump Sum amount of One Hundred Ninety-Nine Thousand, Nine Hundred Ninety-Eight Dollars, and Thirty-Eight Cents ($199,998.38) for Basic Services as estimated by the ENGINEER and set forth in Attachment B, "Consultant's Estimate of Compensation."

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Agreed as to Scope of Services, Time of Performance and Compensation:

Owner: **City of Crossville**

Signature | Date

Engineer: **Atkins North America, Inc.**

Signature | Date

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Attachment A

Scope of Services
For
Planning Services
For The
Airport Layout Plan Update with Narrative Report
At The
Crossville Memorial Airport – Whitson Field (CSV)

The following provides a basic outline and draft schedule of the Airport Layout Plan update with a narrative report for Crossville Memorial – Whitson Field. The schedule is subject to change pending notice to proceed.

1. BACKROUND INFORMATION

Crossville Memorial Airport – Whitson Field (CSV or "Airport") is a public airport located in Crossville, Tennessee that is owned and operated by the City of Crossville (OWNER). At the request of the OWNER, ATKINS (CONSULTANT) has developed this scope of services to define the effort necessary to accomplish planning services for the Airport Layout Plan Update and Narrative Report (the "Project") at CSV. The project involves the preparation of an Airport Layout Plan (ALP) update and narrative report (the "Report") for CSV to serve as a guide to airport development during the period 2019-2039. The process will explore and identify relevant issues and stakeholder concerns while developing recommended alternatives to reflect the will and vision of CSV and the OWNER, the airport's owner and operator ("Sponsor" in FAA and TDOT terminology), and its various constituencies.

The previous ALP for CSV was completed in January 2010. Since that time, many of the projects identified in the airports capital improvement program have been completed, including multiple pavement rehabilitations, obstruction clearing, aircraft storage hangar construction, and more. In addition, significant changes to the Federal Aviation Administration (FAA) airport design standards have been implemented. A review and update of the airfield geometry, design surfaces, and future development is necessary to ensure compliance with current standards.

In February 2019, Atkins, in associated with Quantum Spatial, Inc., completed an obstruction analysis which evaluated all obstructions in the immediate vicinity of the airport and within all Part 77 imaginary surfaces. The purpose of the study was to identify all potential obstructions in order to understand the magnitude of potential clearing.

The ALP and Report will utilize these previous studies, and other documents available and provided by the OWNER, as a starting point. The data and recommendations in these documents will be assembled, reviewed, and expanded upon as part of this project, where applicable.

The project is being funded, in part, by the State of Tennessee, Department of Aeronautics, State Block Grant, which is provided by the FAA. Therefore, the CONSULTANT will use a planning process based upon guidance of FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, supplemented by AC 150/5300-13A, *Airport Design*, and all other applicable FAA and TDOT guidance. As such, the following ALP and narrative report elements need to be addressed:

- Inventory of Existing Conditions;
- Airports GIS Survey;
- Determination of Runway Safety Area Standards;
- Forecast of Aviation Activity;
- Facility Requirements and Alternatives;
- Airport Layout Plan Update, including Airport Property Map; and,
- Capital Improvement Program.

2. SCOPE OF SERVICES

The final ALP and narrative report document will be the result of an orderly series of activities based on FAA and TDOT requirements. Work will be broken down into major tasks with sub-tasks identified to fulfil the requirements of the task. For the purposes of scope definition and CONSULTANT fee development, the work has been divided into the tasks and sub-tasks indicated below. Any modifications and/or revisions to these tasks will constitute a change in the project scope and may require a revision to the compensation to be paid to the CONSULTANT. These tasks will begin once the OWNER provides the CONSULTANT with a written Notice to Proceed.

Element 1. Airport Layout Plan (ALP) Set

The ALP will be developed in accordance with FAA and TDOT requirements as outlined in FAA ARP Standard Operating Procedure 2.00, *Standard Procedures for FAA Review and Approval of Airport Layout Plans (ALPs)*, and the TDOT ALP Review Checklist. All airport design surfaces will be based on guidance available at the time that Notice to Proceed (NTP) is provided. All sheets outlined below will be developed in 22" x 34" landscape page size.

Task 1.1 Project Management and Coordination

This task involves the internal management of the ALP Set including project bookkeeping, billing, subcontracts, and coordination with project stakeholders. The Project Manager (PM) will be readily available to the project team and the AIRPORT to oversee necessary ALP related elements. The PM will keep the AIRPORT advised of the work progress, schedule, and anticipated review dates. The PM will be the CONSULTANT's main point of contact and will be responsible for ensuring that the Project's goals and objectives are met within the agreed upon schedule.

Task 1.2 Meetings

In an effort to complete this project sustainably, the CONSULTANT'S PM and/or technical leads will schedule all ALP meetings in an online format. The CONSULTANT'S technical leads will attend up to one additional meeting in person when/if deemed necessary by the AIRPORT and/or the CONSULTANT. The CONSULTANT'S PM will attend all meetings in person to ensure project success when/if deemed necessary by the AIRPORT and/or the CONSULTANT. The following meetings will be scheduled by the CONSULTANT:

- 30 Percent Progress Meeting
    - The 30 Percent progress meeting will be scheduled at the completion of the ALP drawing with existing features only.
- 60 Percent Progress Meeting
    - The 60 Percent progress meeting will be scheduled at the completion of the ALP drawing, including the selected preferred alternative, and Airport Data Sheet.
- 90 Percent Progress Meeting
    - The 90 Percent progress meeting will be scheduled at the completion of the ALP set as outlined in the tasks below and the completion of the FAA ARP SOP 2.00 ALP Checklist.

Task 1.3 Title Sheet

The CONSULTANT will develop a unique title sheet to serve as the first sheet in the ALP set.

Task 1.4 Airport Layout Plan

The ALP sheet will display all existing facilities and airport design surfaces along with the preferred alternative selected by the AIRPORT and stakeholders. The preferred alternative and its corresponding impacts will be displayed to illustrate the selected airport improvements.

*Note: The Airport Layout Plan may be separated into an Existing Facilities sheet and Airport Layout Plan sheet if existing, future, and ultimate (if applicable) development and design surfaces cannot be clearly identified. Separation of the Airport Layout Plan sheet will be at the discretion of the CONSULTANT.

Task 1.5 Airport Data Sheet

The Airport Data sheet will display all pertinent airport, runway, taxiway, wind, modification of design standards, and declared distances data as outlined in FAA ARP SOP 2.00.

Task 1.6 Terminal Area Plan

The Terminal Area Plan drawing(s) will be developed to illustrate a large-scale view of area's with significant terminal development. The Terminal Area Plan drawing(s) will be enlargements of portions of the Airport Layout Plan.

Because this sheet serves primarily as an inventory of buildings, the CONSULTANT will request current information on buildings from the AIRPORT. Information may include, but is not limited to, tenant currently occupying building, building square footage, and building height.

Task 1.7 Inner Portion of the Approach Surface Drawing

The inner portion of the approach surface drawing(s) (often referred to as Plan and Profile sheets) is a depiction of 3-dimensional surfaces built off the AIRPORT runway ends. The CONSULTANT will combine surveyed obstacles with the FAA Digital Obstacle File (DOF) and portray all obstacles within 10 feet of penetrating the inner approach. Obstacles will be displayed in plan and profile format. An obstacle identification table will also be developed on this sheet.

Task 1.8 Part 77 Airspace

The FAR Part 77 surfaces associated with the ultimate AIRPORT configuration and approaches will be generated and superimposed on USGS quadrangle maps. Fifty-foot contour intervals will be shown for FAR Part 77 sloping imaginary surfaces. This sheet will depict objects violating FAR Part 77 surfaces that have not been identified on the ALP or Inner Approach plan and profile sheets. The top elevation of each obstruction will be identified on the sheet, as will the disposition of the obstruction. The dimensions of the approach surfaces and transitional surfaces will be charted. The airspace plan (FAR Part 77 Surfaces) will depict the full length of all approach surfaces in both plan and profile view.

Task 1.9 Airport Departure Surfaces

The CONSULTANT will develop this sheet to display the runway departure surfaces (existing and future) in plan and profile view. All obstacles found to penetrate the departure surface will be shown as well as traverse way intersections to the departure surfaces. Departure surfaces only apply to runways with instrument departures per FAA Advisory Circular (AC) 150/5300-13A.

Task 1.10 On-Airport Land Use Plan

A Land Use Drawing for the area within the boundaries of the airport will be updated based on the identified overall development concepts. Included in the drawing will be aeronautical uses, agricultural uses, and industrial/commercial development areas. A depiction of current land uses in the immediate airport vicinity will also be included. Standard classifications of land use (e.g., residential, commercial, agricultural, etc.), in addition to the identification of major noise sensitive institutional land uses, will be undertaken. The land use and information will be depicted graphically over a street layout of the airport environs showing the airport and major geographical features.

Task 1.11 Prepare Draft Airport Layout Plan (ALP) Set

Task 1.11 Deliverable

A total of five full size draft ALP sets will be prepared under this task. Two sets will be sent to TDOT, and three sets to the AIRPORT for review. The CONSULTANT will coordinate with TDOT during the review of the ALP and maintain communication with the AIRPORT during the review. The CONSULTANT will perform up to two rounds of review and edits on the draft ALP.

Task 1.12 Prepare Final Airport Layout Plan (ALP) Set

As a final product, the CONSULTANT will provide hard copies of the ALP Set suitable for signature to be distributed to the AIRPORT, the FAA, and TDOT. A total of five hardcopies will be provided along with the electronic version.

Element 2. Exhibit ‘A’ Airport Property Inventory Maps

An Airport Sponsor has a federal obligation to submit accurate Exhibit ‘A’ Airport Property Inventory Maps (Exhibit ‘A’) when applying for and prior to execution of certain federal grants. The Airport Sponsor is required to maintain and update the Exhibit ‘A’ by submitting it to the Federal Aviation Administration (FAA) Airports Specialist. The Exhibit ‘A’ is a snapshot of the inventory of parcels that make up dedicated airport property. The Exhibit ‘A’ indicates how the land was acquired, the funding source for the land and if the land was conveyed as Federal surplus land or Government Property. Other detached parcels owned by the Airport Sponsor that are dedicated to airport purposes must also be shown on the Exhibit ‘A’. The Exhibit ‘A’ must show all dedicated airport property regardless of the type of funds (AIP, state, local, etc.) used to acquire that property.

Task 2.1 Project Management and Coordination

This task involves the internal management of the Exhibit ‘A’ Airport Property Inventory Maps including project bookkeeping, billing, subcontracts, and coordination with project stakeholders. The Project Manager (PM) will be readily available to the project team and the AIRPORT to oversee necessary Exhibit ‘A’ related elements. The PM will keep the AIRPORT advised of the work progress, schedule, and anticipated review dates. The PM will be the CONSULTANT’s main point of contact and will be responsible for ensuring that the Project’s goals and objectives are met within the agreed upon schedule.

Task 2.2 Data Collection

The AIRPORT will be responsible for providing all pertinent information for all airport owned properties, easements, or other properties with airport interest, and all former airport owned properties. Each property/easement/interest shall include all the following information, as applicable:

- Legal Description in metes and bounds;
- Date of acquisition and/or sale;
- Grantor (selling owner);
- Type of interest acquired;
- Acreage;
- Type of conveyance instrument;
- Liber/book and page of recording;
- FAA and/or TDOT grant number and year if acquired by grant;
- Type of easement (if applicable); and,
- Any known encumbrances

Task 2.3 Preliminary Draft Exhibit 'A' Airport Property Inventory Map

The CONSULTANT will prepare a preliminary draft Exhibit 'A' for the purpose of identifying properties associated with the recently completed obstruction survey. The preliminary draft Exhibit 'A' will include the airport property based on information provided in Task 2.2. The preliminary draft Exhibit 'A' will include the previously completed Airport Layout Plan for reference only.

Task 2.3 Deliverable

A preliminary draft Exhibit 'A' Airport Property Inventory Map in electronic format (PDF) and one full size hardcopy. Electronic versions will be submitted to the AIRPORT and TDOT for review and comment. Comments will be addressed as part of Task 2.4.

Task 2.4 Exhibit 'A' Airport Property Inventory Map

The CONSULTANT will prepare the Exhibit 'A' based on all information provided in Task 2.2. It is understood that the CONSULTANT will be provided all necessary documentation and will not be responsible for identification or inclusion of any parcels, easement, or other airport interests not provided in Task 2.2.

Task 2.5 Prepare Draft Exhibit 'A' Airport Property Inventory Map

Task 2.5 Deliverable

A total of five full size draft Exhibit 'A' Airport Property Inventory Maps will be prepared under this task. Two sets will be submitted to TDOT along with an electronic version, and three sets to the AIRPORT along with an electronic version for review. The CONSULTANT will coordinate with TDOT during the review of the Exhibit 'A' and maintain communication with the AIRPORT during the review. The CONSULTANT will perform up to two rounds of review and edits on the draft Exhibit 'A'.

Task 2.6 Prepare Final Exhibit 'A' Airport Property Inventory Map

As a final product, the CONSULTANT will provide hard copies of the Exhibit 'A' Airport Property Inventory Map suitable for signature to be distributed to the AIRPORT, the FAA, and TDOT. A total of five hardcopies will be provided along with the electronic version.

Element 3. Airports-GIS

Task 3.1 Project Management and Coordination

This task involves the internal management of the Airports-GIS survey including project bookkeeping, billing, subcontracts, and coordination with project stakeholders. The Project Manager (PM) will be readily available to the project team and the AIRPORT to oversee necessary Airports-GIS related elements. The PM will keep the AIRPORT advised of the work progress, schedule, and anticipated review dates. The PM will be the CONSULTANT's main point of contact and will be responsible for ensuring that the Project's goals and objectives are met within the agreed upon schedule.

Task 3.2 Aerial Mapping

The CONSULTANT will retain the services of a qualified sub-consultant to obtain aerial imagery. The *imagery will be obtained in accordance with FAA guidelines established in AC 150/5300-16A, 150/5300-17C, and 150/5300-18B.*

The sub-consultant will be responsible for preparation and submittal of a Statement of Work (SOW), Survey and Quality Control Plan, Imagery Acquisition Plan, Imagery Acquisition Report, and all associated data files as required for submission to the FAA AGIS online database.

The Project will conform to the National Map Accuracy Standards for 1 inch to 100 feet scale for planimetric feature collection, two-foot contours, and six- and twelve-inch orthophoto production. In addition, the photogrammetric mapping will meet FAA and NGS standards.

The sub-consultant will build a digital terrain model (DTM) by collecting mass points and breaklines. These DTM elements will be used to construct a triangulated irregular network (TIN) surface from which 2-foot contours will be interpolated. All contours will be continuous polylines. The final data will be delivered in ESRI Shapefile format for use by the FAA.

Task 3.3 Survey Data

The CONSULTANT will provide ground survey to support the aerial mapping services to meet the FAA Airports Geographic Information System (AGIS) requirements. Prior to commencement of field work a Statement-*of-Work and a Survey & Quality Control Plan meeting the requirements of FAA AC 150/5300-18B, Section 2.6.2, will be completed and submitted to the AGIS project website. This report shall be used to provide guidance throughout the course of the project to assure that the data is complete, reliable, and accurate. The CONSULTANT or assigned sub-consultant will minimize, where practical, the time required for runway closures and provide a two-week notice of a required runway closure to the AIRPORT. The two-week notice period may be shortened if the AIRPORT agrees.*

The aerial photography will be completed with ABGPS control which will be used for the base control for the geo-referencing of the aerial imagery. The sub-consultant will process the ABGPS data using COR stations and reference it to the project control datums:

Horizontal: North American Datum of 1983/2011 (NAD 83(2011)), in the TN State Plane Coordinate System, in US survey feet.

Vertical: North American Vertical Datum of 1988 (NAVD 88)

The sub-consultant will complete all of the remaining on-site ground control surveys, including:

- Geodetic control validation of the existing airport PACS and SACS stations or establish temporary airport control according to the guidelines established in AC 150/5300-16A

- Establishing all necessary photo-identifiable ground control and FAA mandated check-points required to validate the ABGPS and IMU control. Quantum Spatial will provide information on the specific locations of the required control and check points.
- Collection of all the airport runway end positions
- Collection of vertical profiles for all runways
- Collection of the position, elevation, and where required the appropriate navigational aid perpendicular point of all electronic and visual navigational aids (NAVAIDS) located on the airport and associated with any current instrument approach servicing the airport
- Full field-collected attribution of all airport features
- All other tasks, not specifically listed above, as outlined in FAA AC-18B, Table 2-1 "Survey Requirements Matrix for Airport Layout Plan."

The sub-consultant will submit all data collected and associated required deliverable in the formats specified in the appropriate advisory circulars to the FAA Office of Airports, Airports Surveying-GIS Program. All data submissions to the FAA will be through the program's web site athttp://airports-gis.faa.gov.

The AC 150/5300-17C project data deliveries that will not be submitted through the web site will be delivered on external hard drives or DVDs.

The 18B deliverables that will be uploaded to the AGIS website include:

- Imagery Plan and Survey and Quality Control Plan
- Image Delivery (sent to FAA)
- Color digital orthophotos (sent to FAA)
- Digital limited landmark detail outside the airport
- Obstruction survey data for EXISTING Runways8/26

Element 4. Narrative Report

The narrative report will be prepared in accordance with FAA Advisory Circular 150/5070-6B, *Airport Master Plans*, Section 202(c), *Airport Layout Plan Updates*. FAA ARP SOP 2.00 will be completed upon submission of the narrative report. All sections not applicable to the Airport Layout Plan Narrative Report will be marked as N/A.

Task 4.1 Project Management and Coordination

This task involves the internal management of the Narrative Report including project bookkeeping, billing, subcontracts, and coordination with project stakeholders. The Project Manager (PM) will be readily available to the project team and the AIRPORT to oversee necessary Narrative Report related elements. The PM will keep the AIRPORT advised of the work progress, schedule, and anticipated review dates. The PM will be the CONSULTANT's main point of contact and will be responsible for ensuring that the Project's goals and objectives are met within the agreed upon schedule.

Task 4.2 Inventory of Airport Facilities and Services

4.2.1 Review of Existing Documentation

The CONSTULTANT will conduct a review of existing information and provide overview of key items pertaining to the overall study. The CONSULTANT will prepare a list of data needs and present them to the AIRPORT. It will be the responsibility of the AIRPORT to coordinate with County agencies and local

entities to obtain the information requested by the CONSULTANT. Documentation that may be required includes deeds for previously acquired land, off-airport avigation easements, on-airport easements (i.e. utility, etc.), navigational aid documentation, airfield lighting details, and current capital improvement plan.

4.2.2 Inventory of Airport Facilities and Services

4.2.2.1 Airside

CONSULTANT will summarize pertinent airport facilities within the airport security fence. Specifically, this section will include an overview of the following:

- Runways
- Taxiways
- Aprons
- Hangars
- Airfield lighting
- Airfield markings
- Airfield signage
- Navigational aids

4.2.2.2 Landside

CONSULTANT will summarize pertinent airport facilities outside the airport security fence. Specifically, this section will include an overview of the following:

- Airport Tenants
- Automobile parking
- Perimeter fencing
- Fuel storage
- Road access

4.2.2.3 Non-Aeronautical Facilities and Equipment

CONSULTANT will summarize pertinent non-aeronautical facilities that are located on-airport property. CONSULTANT will summarize airport owned and operated equipment. This section will include an overview of the following;

- Maintenance Equipment
- Snow Removal Equipment
- Operational Support Equipment
- Significant Non-Aeronautical Facilities

Task 4.2 Deliverable

The CONSULTANT will provide a draft Inventory section to the AIRPORT for up to two rounds of review and comment. The CONSULTANT will adjust the section based on AIRPORT comments and provide a completed section as part of the overall narrative effort.

Task 4.3 Determination of Runway Safety Area Standards

The CONSULTANT will perform a Runway Safety Area Inventory. This effort will exclusively complete the form located in Appendix A of ARP Standard Operating Procedure (SOP) 8.0: *Runway Safety Area Determination*.

Alternatives for addressing any identified RSA deficiencies will be included as part of the overall airport alternatives development. A separate alternatives analysis specifically for RSA deficiencies, as outlined in the SOP and FAA Order 5200.8, will not be completed. Should additional evaluation of alternatives be necessary, a separate RSA study will be recommended as part of the Airport's CIP.

Task 4.3 Deliverable

The CONSULTANT will complete the form found in Appendix A of the aforementioned SOP and submit to the FAA. The CONSULTANT will include the completed form in an appendix of this narrative effort.

Task 4.4 RSA Determination with Alternatives

The CONSULTANT will complete the Runway Safety Area Determination (RSAD) form located in Appendix B of ARP Standard Operating Procedure (SOP) 8.0: *Runway Safety Area Determination*. In the event the FAA *requires additional RSA evaluation be completed to successfully submit the RSAD form, the CONSULTANT will not be responsible for requested further evaluation.*

A separate alternatives analysis specifically for RSA deficiencies, as outlined in the SOP and FAA Order 5200.8, will not be completed. Should additional evaluation of alternatives be necessary, a separate RSA study will be recommended as part of the Airport's CIP.

Task 4.4 Deliverable

The CONSULTANT will complete the form found in Appendix B of the aforementioned SOP and submit to the FAA. The CONSULTANT will include the completed form in an appendix of this narrative effort.

Task 4.5 Forecast of Aviation Activity

4.5.1 Historical Based Aircraft and Operations

This section provides an overview of historical activity levels at the airport to begin building a context for the forecast of aviation demand. This section will include a summary of historical based aircraft and historical aircraft operations as reported in the FAA's Terminal Area Forecast (TAF) and the FAA's Operations and Performance Database. Additionally, the CONSULTANT will document any local trends and activity provided by the AIRPORT that may influence the airports future activity.

4.5.2 Aviation Activity Projections

The CONSULTANT will utilize the historical based aircraft and operations data collected in section 3.4.1 to generate a forecast of based aircraft and operations. The CONSULTANT will apply the trend analysis, extrapolation, and market share analysis techniques to determine an appropriate forecast for the airport. The CONSULTANT will compare the results of the forecasts for reliability and consistency with the FAA TAF and any available State System Plan. In addition to a forecast of based aircraft and operations, a fleet mix forecast will be conducted.

Task 4.5 Deliverable

The CONSULTANT will provide a draft forecast to the AIRPORT for review and comment. The CONSULTANT will adjust the forecast based on AIRPORT comments. The CONSULTANT will submit the forecast to TDOT and the FAA for review and approval. The CONSULTANT will address all comments provided by both TDOT and the FAA and resubmit, if necessary.

Task 4.6 Facility Requirements & Alternatives

4.6.1 Facility Requirements

This section will compare the inventory section to the forecast of aviation activity section and determine the modifications the Airport should make as a result. The CONSULTANT will summarize areas found in the comparison and propose recommendations as a result. This analysis will include both airside facilities and landside facilities.

4.6.2 Alternatives

The CONSULTANT will take the results of the facility requirements section and develop two airport alternatives. The alternatives will be presented in narrative format as well as graphical display. Airport alternatives will include both airside and landside alternatives. The Alternatives are vital to developing the Airport Layout Plan (ALP) and require timely review and comment by the AIRPORT and its stakeholders to complete this project on the designated timeline.

The AIRPORT will select its “preferred alternative” based on the proposed alternatives. The preferred alternative can be one of the two alternatives, or a combination of both. The preferred alternative selection is solely up to the AIRPORT and its stakeholders.

Task 4.6 Deliverable

The CONSULTANT will provide alternatives in graphical exhibit format to the AIRPORT for review and comment. The CONSULTANT will collect up to two rounds of responses on alternatives. Upon selection of the preferred alternative, the CONSULTANT will develop the alternatives narrative summarizing the alternatives and the preferred alternative selected. The CONSUTLANT will provide the narrative to the AIRPORT for review and comment. The CONSULTANT will adjust the alternatives section based on AIRPORT comments and provide the completed section as part of the overall narrative effort.

Task 4.7 Land Use and Ownership

The CONSULTANT will perform a review of the existing land use on and adjacent to the Airport. This effort will not include an Exhibit A. Potential incompatible land uses and developable areas near the airport will be identified based on a review and evaluation of City, County, or regional comprehensive plans, small area plans, zoning controls, sub-division regulations, and other documentation.

Task 4.8 Capital Improvement Plan (CIP)

Based on the selected alternatives, the CONSULTANT will develop a capital improvement plan (CIP) that reflects requirements developed and refined in previous tasks for the short (5-year), medium (10-year), and long-term (20-year) planning horizons. Projects and development tasks within each period will be individually scheduled and priced. Funding availability and required pre-development tasks will also be considered during scheduling. The short-term development schedule will be coordinated closely with the AIRPORT to reflect near term priorities and funding availability. The airports existing CIP will be integrated and updated based on the new development plan.

Task 4.9 Prepare Draft Narrative Report

Task 4.9 Deliverable

A total of five hardcopy Narrative Reports will be prepared under this task. Two copies will be submitted to TDOT along with an electronic version, and three copies to the AIRPORT along with an electronic version for review. The CONSULTANT will coordinate with TDOT during the review of the Narrative Report and maintain communication with the AIRPORT during the review. The CONSULTANT will perform up to two rounds of review and edits on the draft Narrative Report.

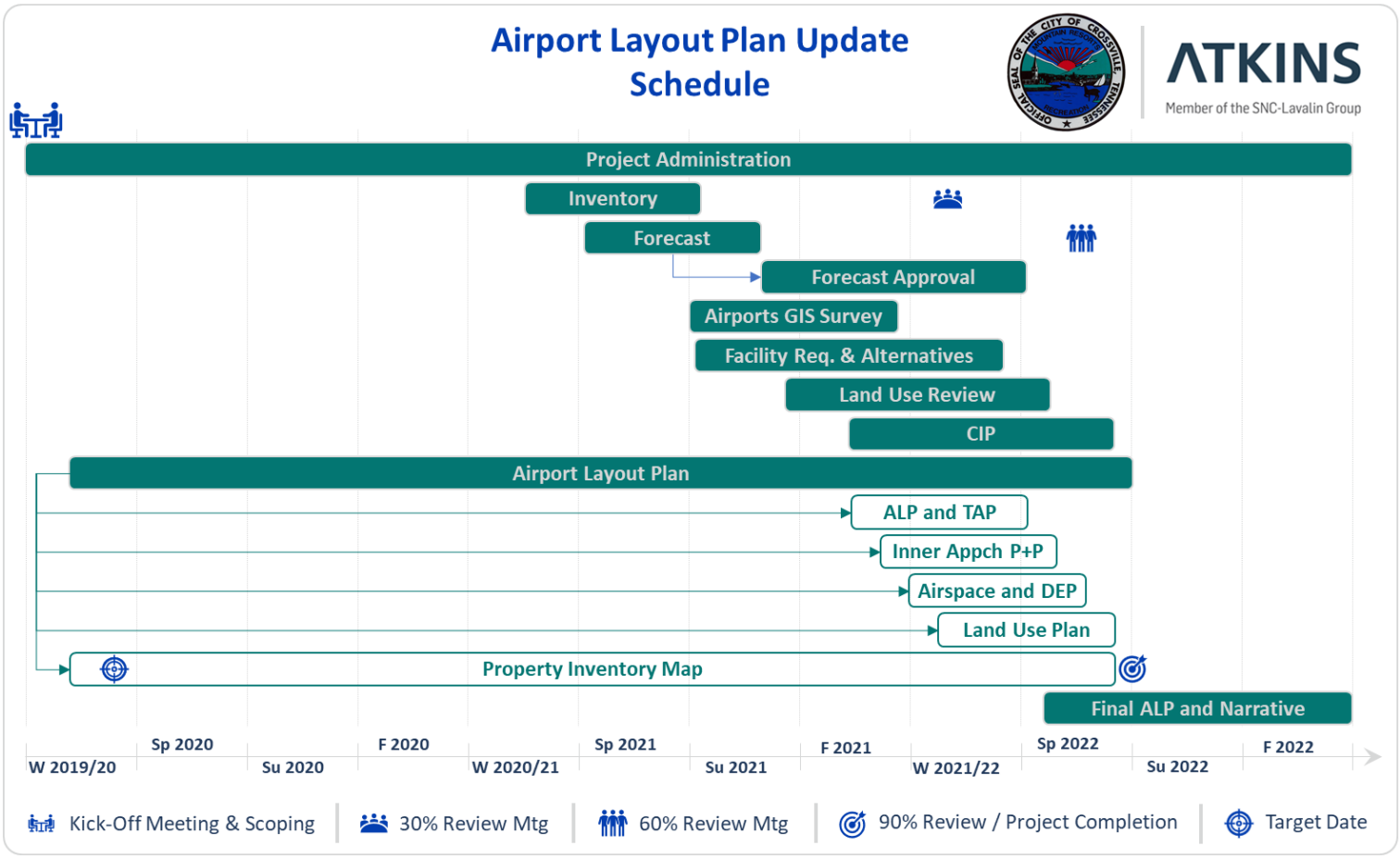
Task 4.10 Prepare Final Narrative Report

As a final product, the CONSULTANT will provide hard copies of the Narrative Report suitable for signature to be distributed to the AIRPORT, the FAA, and TDOT. A total of five hardcopies will be provided along with the electronic version.

Draft Schedule

The CONSULTANT will begin preparation of the draft Exhibit 'A' Airport Property Inventory Map following the acceptance of the project scope of services and associated fee. The project will be put on hold following delivery of the preliminary draft Exhibit 'A' Airport Property Inventory Map until which time the obstruction removal has been completed or August 1, 2021. The AGIS Survey must be completed by August 31, 2021 in order for the ALP and Narrative Report to be completed prior to the grant expiration of September 5, 2022.

The following is a draft schedule and is subject to change pending notice to proceed. This schedule was developed based on input from TDOT and the AIRPORT.



Winter (W) – Dec. 1 to Feb. 28/29 | Spring (Sp) – Mar. 1 to May 31 | Summer (Su) – June 1 to Aug. 31 | Fall (F) - Sept. 1 to Nov. 30

Kickoff Meeting – November 2019

Complete Draft Exhibit 'A' – April 2020

Complete Aerial Survey – November 2021

30% Review – January 2022

60% Review – April 2022

90% Review – June 2022

Final ALP – June 2022

Addendum to Attachment A

November 14, 2019

Mr. Gavin Fahnestock
Sr. Aviation Planner, National Aviation Services
North America
Aviation Planning
7175 Murrell Road
Melbourne, Florida 32940

Project: Airport Layout Plan Update – Crossville Memorial Airport – Whitson Field (CSV)

Dear Mr. Fahnestock,

This summary of work describes our understanding of the scope of work and services required for a Airport Layout Plan and aeronautical obstruction survey at the Crossville Memorial Airport – Whitson Field (CSV) located in Crossville, TN. The project will be done in compliance with AGIS policies and will include an airport airspace analysis for vertically-guided operations for EXISTING Runway 8-26. The Advisory Circulars identified below detail the data collection requirements and accuracies for the project and the verification process by the Federal Aviation Administration (FAA) and the National Geodetic Survey (NGS).

- AC 150/5070-6B, Change 2 "Airport Master Plans"
- AC 150/5300-13A, Change 1 "Airport Design"
- AC 150/5300-16A "General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey"
- AC 150/5300-17C, Change 1 "Standards for Using Remote Sensing Technologies in Airport Surveys"
- AC 150/5300-18B, Change 1 "Survey and Data Standards for Submission of Aeronautical Data Using Airports GIS

Summary of Work

We understand that the purpose of this project is to accomplish an FAA Airport Airspace Analysis Survey for all surfaces defined in FAA Advisory Circular 150/5300 - 18B: Section 2.7.1.1 Runways with Vertical Guidance. In addition, we will collect FAR Part 77 data.

For this project, we will acquire new vertical stereo digital imagery at a physical image scale of 1"= 4,018' of the obstruction surface areas and 1"= 1,042' of the airport property. The aerial imagery will cover all of the VG Airspace Analysis surfaces using an Digital Mapping Camera II (DMC II) digital sensor, or comparable, during leaf-on conditions.

From the 1"= 4,018' imagery, we will produce the following:

- Limited landmark feature planimetric mapping
- Color digital orthophotos with a 1.0' pixel resolution
- Identification and mapping of obstruction obstacles for all of the VG surfaces

From the 1"= 1,042' imagery, we will produce the following:

- 100 scale mapping with 2' contours of the existing airport property (395 acres)
- Identification and mapping of obstruction obstacles for the VGRPS, VGPCS & VGPS surfaces

The online SOW will be prepared during project initiation with input from the airport, client and Quantum Spatial. Quantum Spatial will be responsible for preparation and submittal of the Survey and Quality Control

Plan, Imagery Acquisition Plan, Imagery Acquisition Report, Final Project Report and all associated data files as required for submission to the FAA AGIS online database.

Quality Standards

The project has been designed to conform to the National Map Accuracy Standards for 1"=100' scale planimetric feature collection, two foot contours and six and twelve inch orthophoto production. In addition, we insure that the photogrammetric mapping will meet all FAA and NGS standards. We will exercise reasonable care and will conform to the standards of practice ordinarily used by the photogrammetric profession.

Project Area

The project area encompasses all of Crossville Memorial Airport – Whitson Field (CSV) inclusive of the obstruction surfaces as defined in AC 150/5300-18B.

Control Surveying

The aerial photography will be completed with ABGPS control which will be used for the base control for the geo-referencing of the aerial imagery. Quantum Spatial will process the ABGPS data using COR stations and reference it to the project control datums:

Horizontal: North American Datum of 1983/2011 (NAD 83(2011)), in the TN State Plane Coordinate System, in US survey feet.
Vertical: North American Vertical Datum of 1988 (NAVD 88)

Quantum Spatial will complete all of the remaining on-site ground control surveys, including:

- Geodetic control validation of the existing airport PACS and SACS stations or establish temporary airport control according to the guidelines established in AC 150/5300-16A
- Establishing all necessary photo-identifiable ground control and FAA mandated check-points required to validate the ABGPS and IMU control. Quantum Spatial will provide information on the specific locations of the required control and check points.
- Collection of all the airport runway end positions
- Collection of vertical profiles for all runways
- Collection of the position, elevation, and where required the appropriate navigational aid perpendicular point of all electronic and visual navigational aids (NAVAIDS) located on the airport and associated with any current instrument approach servicing the airport
- *Full field-collected attribution of all airport features*
- All other tasks, not specifically listed above, as outlined in FAA AC-18B, Table 2-1 "Survey Requirements Matrix for *Airport Layout Plan*."

Photogrammetric Mapping

We will collect the features normally shown on 1"=100' scale mapping within the mapping limits identified in the RFP (see exhibit).

We will build a digital terrain model (DTM) by collecting masspoints and breaklines. These DTM elements will be used to construct a triangulated irregular network (TIN) surface from which 2' contours will be interpolated. Contours will be dashed in areas where the ground is obscured by trees, dense brush, deep shadows or other obstructing features. Dashed contours indicate a lower level of accuracy. Additional field surveys should be performed in areas of dashed contours prior to design. All contours will be continuous polylines. The final data will be delivered in ESRI Shapefile format (FAA) and CAD format (Atkins).

Orthophoto Mapping

We will use the control solution and imagery to generate a Digital Elevation Model (DEM) of the VG surfaces. The imagery will be processed into color digital orthophotos using the aforementioned DEM to rectify the images. Orthophotos for the entire project area will be developed with a 1.0' pixel resolution and for the airport property, with a 0.5' pixel resolution. Orthos will be delivered in a GeoTIFF file format.

18B Obstruction Surveys

The Obstructions Surfaces to be uploaded to the AGIS database will satisfy the requirements of AC 150/5300-18B:

- 2.7.1.2 Analysis of EXISTING Runways 8/26 with Vertically Guided Operations
  (Surfaces include the VGRPS, VGPCS, VGAS, VGPS, VGATS, VGHS and VGCS)

The specific types and quantities of obstructions for each surface are outlined and clearly defined for the particular surface in each circular section. Any obstructions that meet the requirement of the circular, but are of a nature that elevations at the highest point of the obstruction are virtually impossible to read through photogrammetric methods (cell tower, electrical tower, etc.), will be identified and relayed to the surveyor to initiate field surveyed elevations for the obstruction.

The obstruction delivery will include the limited landmark planimetric feature collection.

The final data will be uploaded in AGIS in ESRI Shapefile format.

Other Obstruction Surveys

Other obstructions to be provided directly to Atkins include:

- Existing Runway 8/26 - Part 77
- Existing Runway 8/26 – TSS 4

Production Schedule

We will work with you to finalize a mutually agreeable schedule for the project after FAA Control Plan approvals. We will make a reasonable effort to maintain the agreed-upon schedule. However, should the project be interrupted by technical problems beyond our control, including control deficiencies or map file re-deliveries rescheduling may become necessary.

Deliverables

Quantum Spatial will submit all data collected and associated required deliverable in the formats specified in the appropriate advisory circulars to the FAA Office of Airports, Airports Surveying-GIS Program. All data submissions to the FAA will be through the program's web site at http://airports-gis.faa.gov.

The AC 150/5300-17C project data deliveries that will not be submitted through the web site will be delivered on external hard drives or DVDs.

The 18B deliverables that will be uploaded to the AGIS website include:

- Imagery Plan and Survey and Quality Control Plan
- Image Delivery (sent to FAA)
- Color digital orthophotos (sent to FAA)
- Digital limited landmark detail outside the airport
- Obstruction survey data for **EXISTING** Runways 8/26

- Planimetric data and two foot contours to 18B specs (Shapefile format)
- Photogrammetrically derived and surveyed attributes in defined format
- Surveyed ends and profile for each runway
- NAVAID data
- FGDC compliant metadata
- Final Report

We will deliver the following items to Atkins:

- Topologically structured Planimetric data and two foot contours in Civil 3D format
- Color digital orthophotos with a 1.0' pixel resolution in GeoTIFF (project area)
- Color digital orhtophotos with a 0.5' pixel resolution in GeoTIFF (airport property)
- 2 color enlargements (30"x40") covering the airport and surrounding area (mounted/laminated/framed)
- Other obstruction survey data for Runways 8/26 in Microstation/Excel/CSV file format

All digital files will be delivered on external hard drive or CD/DVD.

Cost and Payment Terms

Compensation for the above services will be provided as a lump sum cost of U.S. $60,390.00

Client Responsibilities

The successful and timely completion of this project is dependent upon a number of elements and work tasks, some of which involve participation by Atkins. You will be responsible for designating a representative for the project who will have the authority to transmit instructions, receive information, and make timely decisions with respect to the services provided by Quantum Spatial.

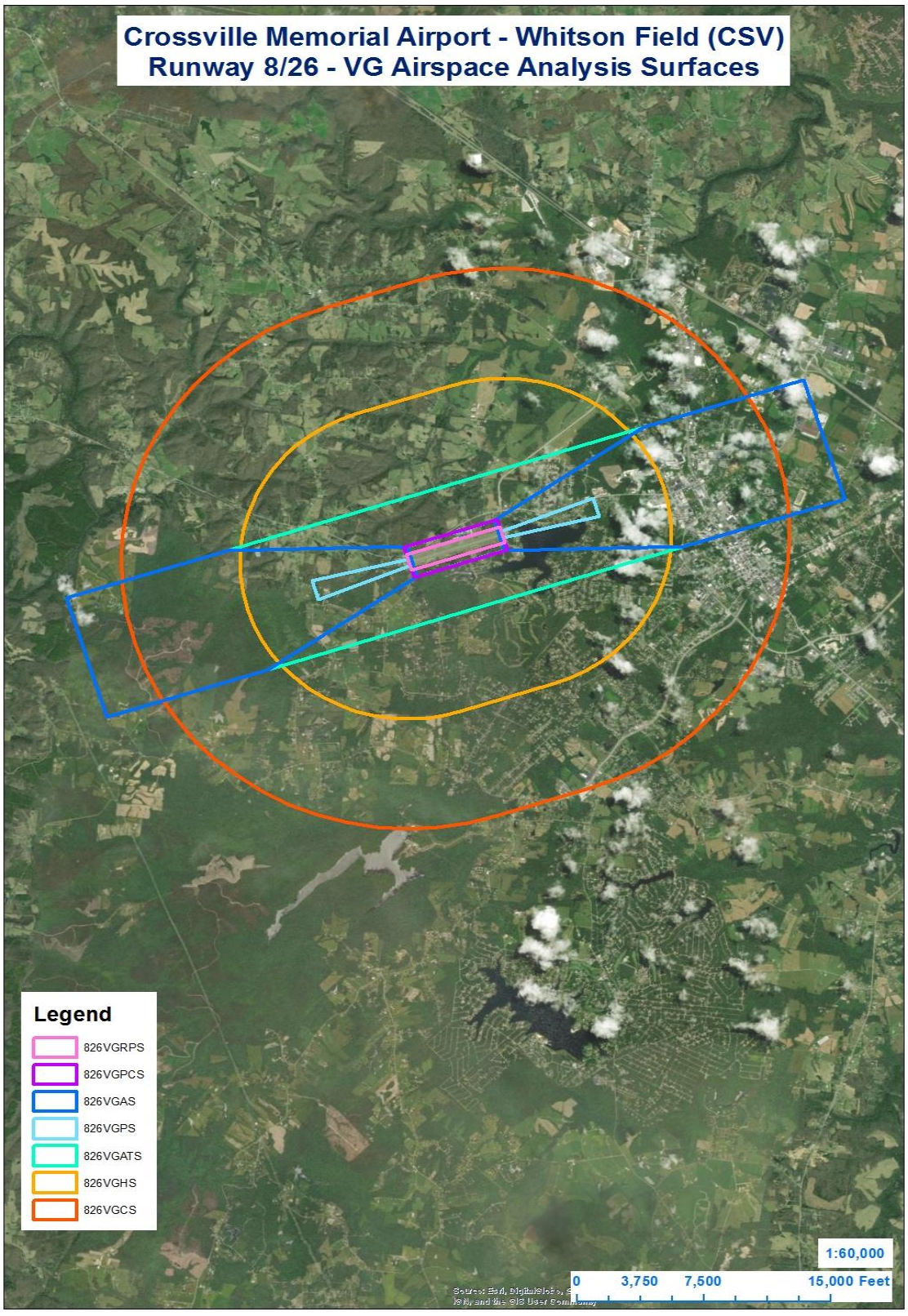
Quantum Spatial Representative

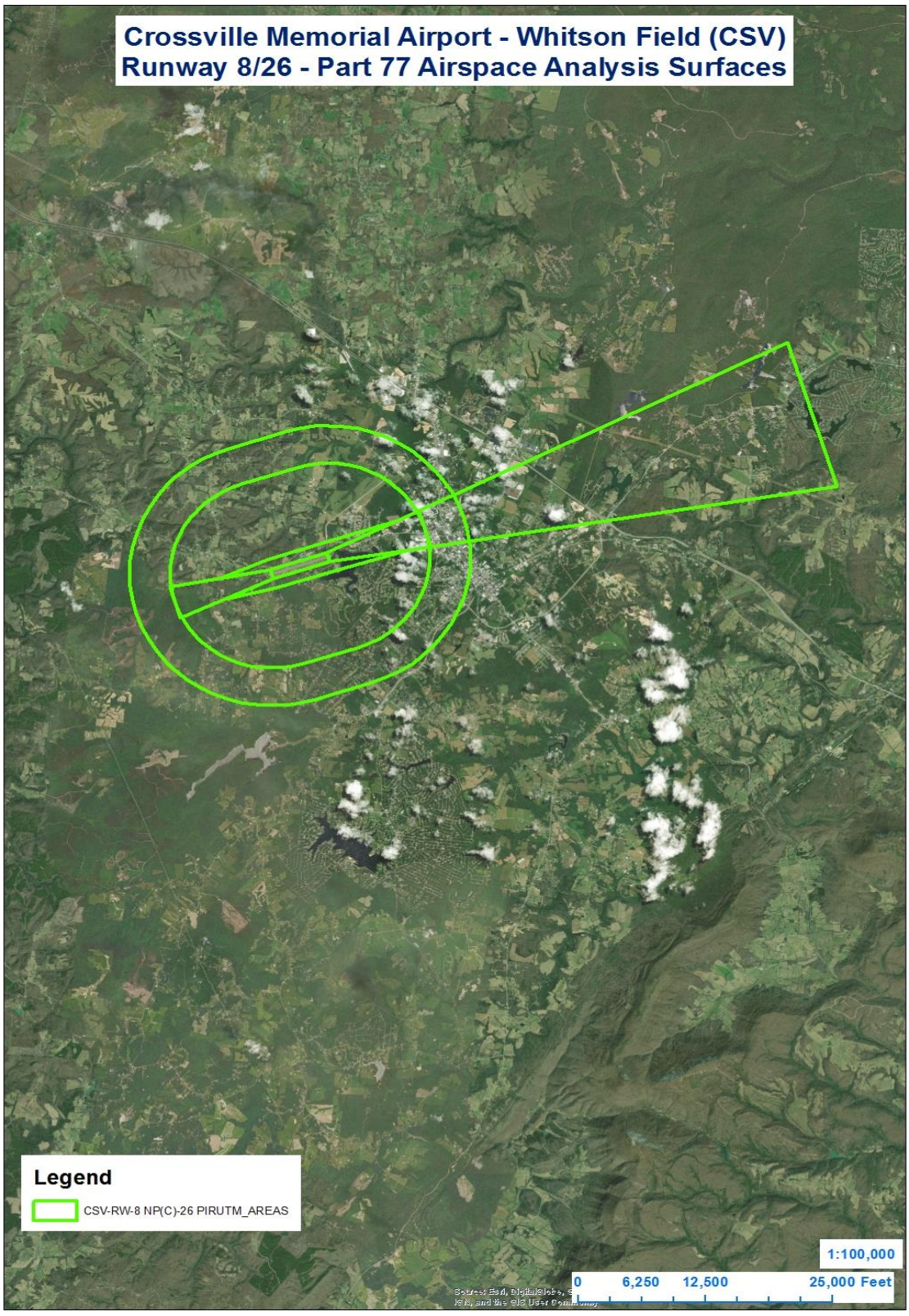
Jill Mahoney, Project Manager and Marlin Zook, Technical Manager, will represent us during the performance of the services to be provided under this agreement. Each has the authority to transmit and receive instructions and make decisions with respect to the services. Each is authorized to commit the necessary resources towards completing the services described herein.

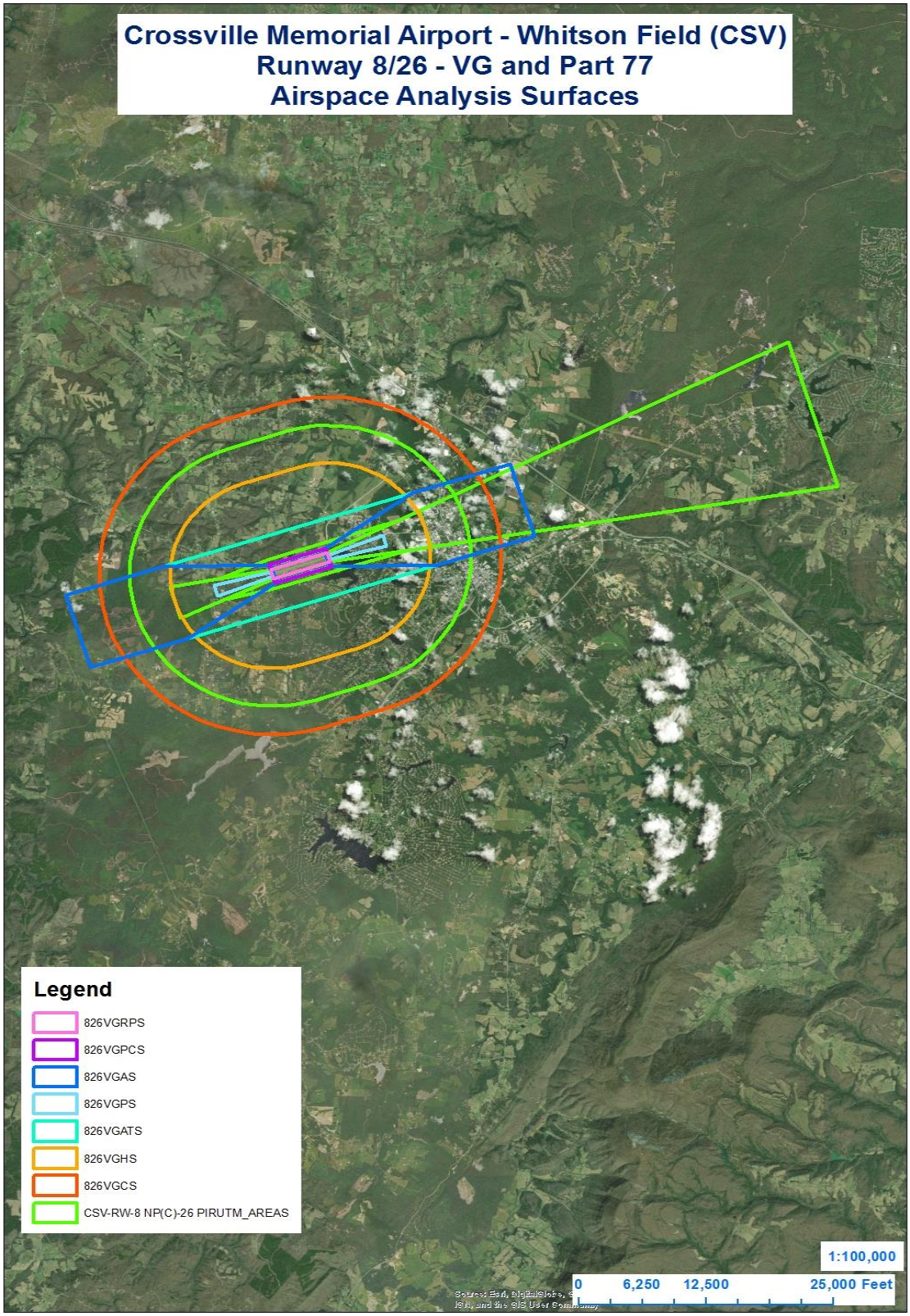
We look forward to working with you and your staff to complete this project in a timely and cost effective manner. Should you have any questions, please call me at (920) 912-6263 or email me at the address shown below.

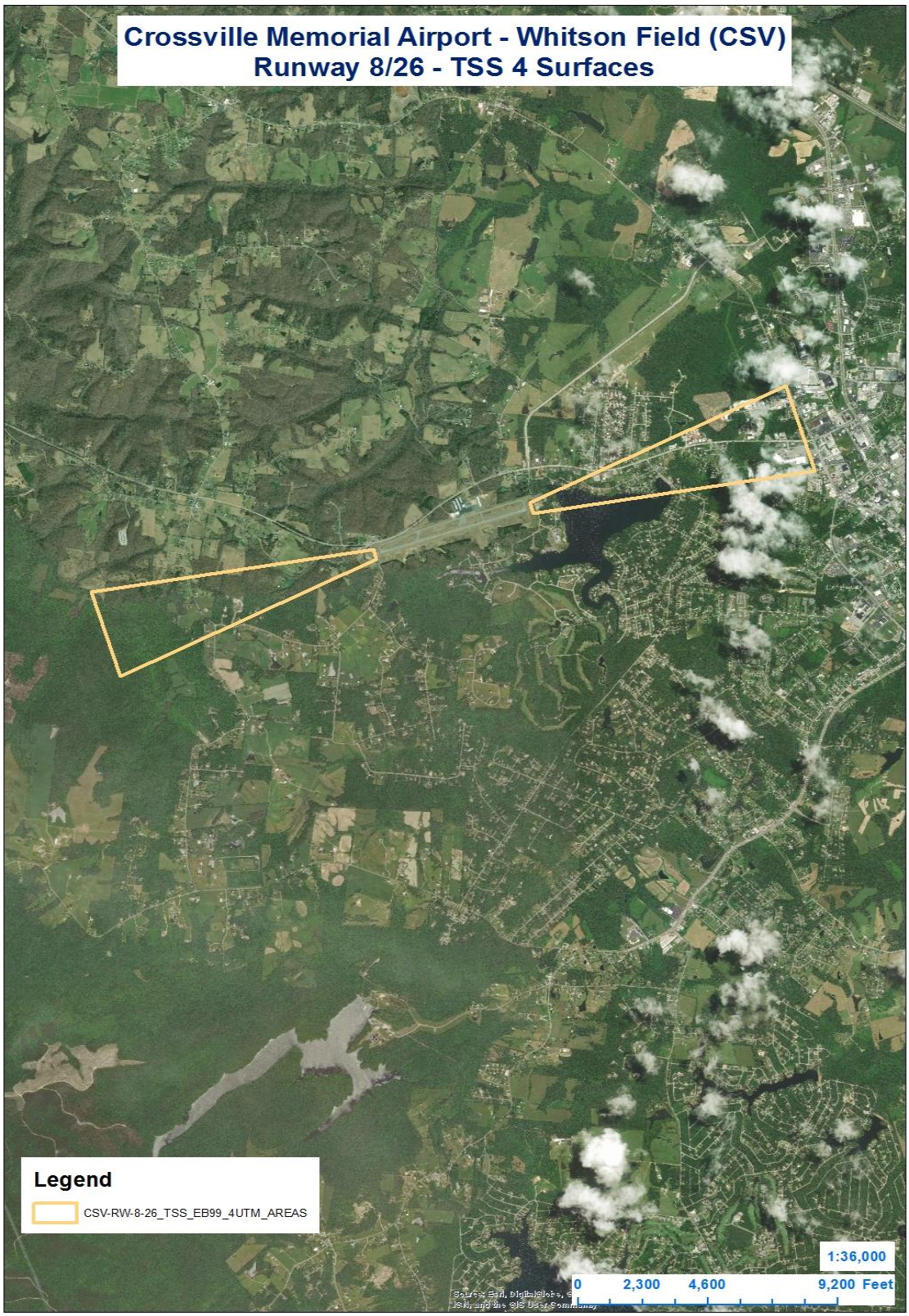
Sincerely,
Quantum Spatial, Inc.

Bob Vander Meer
Vice President
rvandermeer@quantumspatial.com


Crossville Memorial Airport - Whitson Field (CSV)
Runway 8/26 - VG Airspace Analysis Surfaces
Legend
826VGRPS
826VGPCS
826VGAS
826VGPS
826VGATS
826VGHS
826VGCS
1:60,000
0 3,750 7,500 15,000 Feet


Crossville Memorial Airport - Whitson Field (CSV)
Runway 8/26 - Part 77 Airspace Analysis Surfaces
Legend
CSV-RW-8 NP(C)-26 PIRUTM_AREAS
1:100,000
0 6,250 12,500 25,000 Feet


Crossville Memorial Airport - Whitson Field (CSV)
Runway 8/26 - VG and Part 77
Airspace Analysis Surfaces
Legend
826VGRPS
826VGPCS
826VGAS
826VGPS
826VGATS
826VGHS
826VGCS
CSV-RW-8 NP(C)-26 PIRUTM_AREAS
1:100,000
0 6,250 12,500 25,000 Feet


Crossville Memorial Airport - Whitson Field (CSV)
Runway 8/26 - TSS 4 Surfaces
Legend
CSV-RW-8-26_TSS_EB99_4UTM_AREAS
1:36,000
0 2,300 4,600 9,200 Feet


Crossville Memorial Airport - Whitson Field (CSV)
Mapping Limits - 1"=100' Plan with 2 Foot Contours
Legend
Airport Boundary
1:12,000
0 750 1,500 3,000 Feet


Crossville Memorial Airport - Whitson Field (CSV)
Orthophoto Limits - 0.5 Foot GSD
Legend
HALF FT Orthophoto Limits
1:12,000
0 750 1,500 3,000 Feet

DRAFT

ATTACHMENT B
CONSULTANTS ESTIMATE OF COMPENSATION
AIRPORT LAYOUT PLAN UPDATE AND NARRATIVE
CROSSVILLE MEMORIAL - WHITSON FIELD

ATKINS

		PM			PLANNING				SUMMARY	
	Task Description	Principal-in-Charge	Senior Project Manager	Contract Admin	Sr. Environ. Specialist	Sr. Aviation Planner II	Mid-Level Aviation Planner	Sr. Engineer II	Total Man-Hours	Total Task Cost
ELEMENT 1: AIRPORT LAYOUT PLAN (ALP) SET									**423**	**$ 63,346.78**
1.1	Project Management and Coordination	1	20	3	4	5			33	$ 5,175.00
1.2	Meetings		40			40	40		120	$ 17,720.00
1.3	Title Sheet					2	9		11	$ 1,399.00
1.4	Airport Layout Plan					6	45		51	$ 6,375.00
1.5	Airport Data Sheet					4	18		22	$ 2,798.00
1.6	Terminal Area Plan					4	27		31	$ 3,887.00
1.7	Inner Portion of the Approach Surface Drawing					6	27		33	$ 4,197.00
1.8	Part 77 Airspace					4	18		22	$ 2,798.00
1.9	Airport Departure Surfaces					4	36		40	$ 4,976.00
1.10	On-Airport Land Use Plan					2	18		20	$ 2,488.00
1.11	Prepare Draft Airport Layout Plan (ALP) Set					9	18		27	$ 3,573.00
1.12	Prepare Final Airport Layout Plan (ALP) Set					4	9		13	$ 1,709.00
Travel	*Travel Reimbursement*									$ 6,089.18
Exp	*Expenses*									$ 162.60
ELEMENT 2: EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP									**149**	**$ 20,049.60**
2.1	Project Management and Coordination	1	20	3	4	5			33	$ 5,175.00
2.2	Data Collection					2	4		6	$ 794.00
2.3	Preliminary Draft Exhibit 'A' Airport Property Inventory Map					6	27		33	$ 4,197.00
2.4	Exhibit 'A' Airport Property Inventory Map					4	27		31	$ 3,887.00
2.5	Prepare Draft Exhibit 'A' Airport Property Inventory Map					5	18		23	$ 2,953.00
2.6	Prepare Final Exhibit 'A' Airport Property Inventory Map					5	18		23	$ 2,953.00
Exp	*Expenses*									$ 90.60
ELEMENT 3: AIRPORTS GIS									**51**	**$ 67,723.00**
3.1	Project Management and Coordination	1	20	3		5			29	$ 4,535.00
3.2	Aerial Mapping					2	9		11	$ 1,399.00
3.3	Survey Data					2	9		11	$ 1,399.00
SUB	*Quantum Spatial*									$ 60,390.00
ELEMENT 4: NARRATIVE REPORT									**370**	**$ 48,879.00**
4.1	Project Management and Coordination	1	20	3	8	5			37	$ 5,815.00
4.2	Inventory of Airport Facilities and Services					3	27		30	$ 3,732.00
4.3	Determination of Runway Safety Area Standards					9	27		36	$ 4,662.00
4.4	RSA Determination with Alternatives					9	27		36	$ 4,662.00
4.5	Forecast of Aviation Activity					18	18		36	$ 4,968.00
4.6	Facility Requirements and Alternatives					6	27		33	$ 4,197.00
4.7	Land Use and Ownership					6	27		33	$ 4,197.00
4.8	Capital Improvement Plan					6	27	24	57	$ 7,197.00
4.9	Prepare Draft Narrative Report					9	27		36	$ 4,662.00
4.10	Prepare Final Narrative Report					9	27		36	$ 4,662.00
Exp	*Expenses*									$ 125.00
	TOTAL MAN-HOURS	**4**	**120**	**12**	**16**	**206**	**611**	**24**	**1,986**	
	LABOR RATES - HOURLY	**$225**	**$167**	**$65**	**$160**	**$155**	**$121**	**$125**		
	TOTAL FEES - PROFESSIONAL SERVICES	**$900**	**$20,040**	**$780**	**$2,560**	**$31,930**	**$73,931**	**$3,000**		**$ 199,998.38**