

ATTACHMENT IV

BCAD ELECTRONIC MEDIA SUBMITTAL REQUIREMENTS

The Broward County Aviation Department (BCAD) will be utilizing electronic media as the principal way it develops, communicates, and archives information concerning its various construction programs. The County's standard Professional Services Agreements for Consultant/Contractor services require submittal of documents produced on electronic media. Requirements for that media are presented below. Certain requirements may not be applicable to all contracted services and should be verified with the Contract Administrator during the development of the scope of services. When FAA standards do not apply to a project pursuant to FAA regulations, compliance with FAA standards may still be required by BCAD. This will be determined on a project by project basis as it pertains to the best interest of BCAD.

(A) General Requirements:

- 1) All Work, including surveying work, drawings, maps, details, or other drawing information to be provided in electronic media by Consultant/Contractor shall be accomplished and developed using computer-aided design (CAD), geographic information system (GIS), and other software and procedures conforming to the following criteria. Electronic data submittals shall also include PDF versions of pages and documentation. **The Consultant/Contractor shall produce three primary sets of electronic deliverables, electronically signed and sealed in conformance with industry standards:**
 - CAD – Engineering Design Drawings
 - GIS – FAA AGIS Submittal, eALP, and BCAD GIS Use
 - PDF – Electronic Document Review and Storage/As-Builts

(B) CAD and GIS Formats:

- 1) Provide all CAD data in Autodesk, Inc.'s AutoCAD release 2010 or other release as tested and approved by BCAD, for Windows in native .dwg electronic digital format. Provide copies of all drawing sheets or other CAD produced documents intended for hardcopy plotting or printing in plot (.plt) and drawing web format (.dwf) versions of all sheets/documents documents formatted to fit BCAD standard cover sheet and title block (Refer to Section (C)(1) below). All GIS shall be delivered in ESRI ArcGIS version 9.3 or higher. Specific format/s (Shape file, Layer files, geodatabase, and/or other file type/structure shall be of the Aviation BCAD's choosing and must also conform to FAA and BCAD). All deliverables shall include appropriate Metadata conforming to BCAD and FAA standards.

Consultant/Contractor will be required to ensure that all data is formatted and in compliance for submission to the FAA AGIS system without any additional changes required by BCAD staff. Consultant/Contractor must ensure compliance with all standards set forth in latest versions of FAA Advisory Circulars (A/C): 150/5300-16, 150/5300-17, and 150/5300-18.

- 2) Target platform: Windows operating system.
- 3) Ensure that all digital files and data (e.g., constructs, elements, base files, prototype drawings, reference files, blocks, attribute links, and other files external to the drawing itself) are compatible with the BCADs target CAD and GIS systems (i.e., basic and advanced CAD and GIS software, platforms, database software/s, geodatabases, etc.), and adhere to the standards and requirements specified herein.
- 4) The term “compatible” means that data can be accessed directly by the target CAD and GIS systems without translation, pre-processing, or post-processing of the electronic digital data files. It is the responsibility of Consultant/Contractor to ensure this level of compatibility.
- 5) Any non-graphical database delivered with prepared drawings: provide in relational database format compatible with Microsoft Access 2007 or other compatible format release as tested and approved by BCAD. Data shall be delivered in an ESRI Geodatabase format of BCAD’s choosing upon request. GIS and CAD data deliverable shall conform to the latest BCAD and FAA standards, including but not limited to, AC 5300/150-16, 17, and 18, and US National CAD Standards.
- 6) Maintain all linkages of non-graphical data with graphic elements, relationships between database tables, and report formats. Consultant/Contractor should work with BCAD to ensure linkages will conform/match those already in place or generated to create such links.
- 7) All database tables: conform to the structure and field-naming guidance provided upon request by BCAD. Specifically, all database tables shall conform to all FAA and BCAD standards. All databases shall be compliant with at least MS Access 2007 and/or other format (SQL, ESRI Geodatabase, other) as requested by BCAD. Formats may change, at BCADs request, depending on the particulars of the project/s. Consultant/Contractor shall inform BCAD of the most suitable format for a given project and explain, in writing, the benefits of that format versus alternatives. BCAD has the final decision as to format regardless of Consultant’s/Contractor’s written explanation.

- 8) All CAD and GIS files shall meet FAA/NGS spatial accuracy requirements and be georeferenced as follows:

North American Datum (NAD) 83, HARN, Feet
State Plane Florida East
North American Vertical Datum (NAVD) 88

- 9) All data collected shall meet or exceed data acquisition standards established in AC 5300/150-16, 17, and 18, if applicable.

(D) Standards:

- 1) Standard plotted drawing size: 22 inch x 34 inch sheets unless otherwise specified by BCAD. All drawings shall be formatted to use the BCAD standard Cover Page and Title Block.
- 2) Coordinate with BCAD concerning the standard file naming protocol to be utilized. Consultant/Contractor may be required to submit drawing files with several naming conventions to satisfy various submittal requirements.
- 3) Unless otherwise stated, all CAD files shall conform to US National CAD standards (BCADs adopted CAD standard) in addition to FAA standards for submission into the FAA AGIS system.
 - a. All building floor plans/elevations shall be drawn and provided in Architectural Units (unless otherwise requested by BCAD).
 - b. All other plans (site plans, airfield plans, ALPs, etc.) shall be submitted in Engineering Units (unless otherwise requested by BCAD).

(4) Layering:

- a. Conform to the guidelines defined by the US National CAD Standards, appropriate FAA Advisory Circulars and standards, and BCAD standards.
- b. Provide an explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the standards listed above. Submission of layers that do not conform to the standards listed above will require advance BCAD approval.
- c. Raster: All raster files (aerial photography, TIN, DEM, etc.) shall be delivered in georeferenced SID and TIFF formats as defined by BCAD. If files must be tiled, a reference map will be provided depicting the location of each tile image. All raster files shall be tiled if file size reaches a size in

excess of that BCAD finds difficult to use.

(5) Attribute Definitions:

- a. Obtain latest guidance from BCAD concerning attribute definition, database linking and other information embedding requirements prior to production of documents. All database information shall conform to the latest versions of FAA A/Cs 150/5300-16, 17, and 18, and other BCAD standards. Additional attributes may be required at the discretion of BCAD.

(6) Conformance:

- a. Submit a written request for approval of any deviations from the established CAD/GIS standards. Pre-coordinate the development, use and submittal of 3-D modeling, Building Information Models (BIM), photo-realistic renderings, animations, presentations and other visualization/information tools utilized during the design and construction process to ensure compatibility of submittal with County's uses and information systems.
- b. No deviations from BCADs established CAD/GIS standards will be permitted unless prior written approval of such deviation has been received from BCAD.

(E) Non-CAD/GIS Graphic Format: Provide digital photography files (unless required in an alternate format such as that needed for CAD/GIS) and other miscellaneous graphics in JPEG, PDF and TIFF formats. Photos shall be georeferenced in accordance with BCAD standards, if applicable.

(F) Non-Graphic Format:

- 1) Provide word processing files in Microsoft Word 2007 compatible file formats or other compatible format release as tested and approved by BCAD including all fonts, typefaces, bit-map and vector graphics and other information necessary for remote printing.
- 2) Provide spreadsheet files in Microsoft Excel 2007 for windows compatible file formats or other compatible format release as tested and approved by BCAD including all fonts, typefaces, bit-map and vector graphics and other information necessary for remote printing.
- 3) Provide database files in relational database format compatible with Microsoft Access 2007 or higher, and/or other compatible SQL format database

including all tables, form and report formats, fonts, typefaces, bit-map and vector graphics and other information necessary for remote printing. Ensure integrity of relational database structure. Consultant/Contractor may be required to ensure that database formats conform and can be integrated with other BCAD legacy applications and systems.

(G) Delivery Media and Format:

- 1) Submit copies of all CADD/GIS/PDF data and other electronic files developed under this contract on electronic digital media as required for project phase submittals.
- 2) Provide electronic digital data and files shall be provided on DVD/CD or via secure file transfer protocol (FTP) site.
- 3) The electronic digital media shall be in the format which can be read and processed by the BCAD's target CAD/GIS systems.
- 4) The external label for each electronic digital media shall contain, as a minimum, the following information:
 - a. The Project Number, Project Title and date.
 - b. The Facility Name
 - c. The format and version of operating system software.
 - d. The name and version of utility software used for preparation (e.g., compression/decompression) and copying files to the media.
 - e. The sequence number of the digital media.
 - f. A list of the filenames.
 - g. All requirements to meet or exceed FAA and BCAD standards.
- 5) Before all files are placed on the delivery electronic digital media, the following procedures shall be performed:
 - a. Ensure that drawing sheets, viewports, paperspace, line weights, fonts, and other drawing components are correctly configured for BCAD's viewing and plotting.

- b. Make sure all reference files are attached without device or directory specifications.
 - c. Compress and reduce all design files using compatible file compression/decompression software approved by BCAD. If the file compression/decompression software is different from that specified above, then an electronic digital media copy of the file compression/decompression software shall be purchased for BCAD and provided to BCAD with the delivery media.
 - d. Include all files, both graphic and non-graphic, required for the project. All blocks not provided as BCAD-furnished materials must be provided to BCAD as a part of the electronic digital deliverables.
 - e. Make sure that all support files such as those listed above are in the same directory and that references to those files do not include device or directory specifications.
 - f. Include any standard sheets (i.e., abbreviation sheets, standard symbol sheets, or other listing) necessary for a complete project. . These shall conform to BCAD standard Cover sheet and title block pages.
 - g. Document any fonts, tables, or other similar customized drawing element developed by Consultant/Contractor or not provided among BCAD-furnished materials. The contractor shall obtain BCAD's approval before using anything other than BCAD's standard fonts, line types, tables, blocks, or other drawing elements available from BCAD.
- (H) Drawing Development Documentation:
- 1) Provide the following information for each finished drawing:
 - a. How the data were input (e.g., keyed in, downloaded from a survey total station instrument (include name and model), and other identification data).
 - b. Brief drawing development history (e.g., date started, modification date(s) with brief description of item(s) modified, author's name, and other identifying data.).
 - c. The names of the reference, blocks, symbols, details, tables, and schedule files required for the finished drawing.
 - d. Layer assignments and lock settings.
 - e. Text fonts, line styles/types used, and GIS layer file settings.

f. Any additional information per FAA A/Cs and BCAD standards.

(l) Submittal:

- 1) Submit as Project Record Documents specified above and as required for project phase submittals and project record documents.
- 2) Submit electronic media with a transmittal letter containing, as a minimum, the following information:
 - a. The information included on the external label of each media unit (label), along with the total number being delivered, and a list of the names and descriptions of the files on each one.
 - b. Brief instructions for transferring the files from the media.
 - c. Certification that all delivery media are free of known computer viruses. A statement including the name(s) and release date(s) of the virus-scanning software used to analyze the delivery media, the date the virus-scan was performed, and the operator's name shall also be included with the certification. The release or version date of the virus-scanning software shall be the current version which has detected the latest known viruses at the time of delivery of the digital media.
 - d. The following "File Development and Project Documentation Information" as an enclosure or attachment to the transmittal letter provided with each electronic digital media submittal.
 1. Documentation of the plot file for each drawing which will be needed to be able to duplicate the creation of the file by BCAD at a later date. This documentation shall include configuration settings (e.g., drawing size and configuration), and any other special instructions.
 2. List of any deviations from BCAD's standard layer/level scheme and file-naming conventions.
 3. List of all new symbol blocks created for project, which was not provided to Consultant/Contractor with the BCAD-furnished materials.
 4. List of all new figures, symbols, tables, schedules, details, and other blocks created for the project, which were not provided to Consultant/Contractor with the BCAD-furnished materials, and any associated properties.

5. List of all database files associated with each drawing, as well as a description and documentation of the database format and schema design. All information shall conform to FAA and BCAD standards.
6. All metadata per BCAD, FAA, FDOT, or other entity standards.

(J) Ownership:

- 1) County will have ownership of all information and materials developed under these and other contractual requirements including but not limited to reports, and listings, and all other items pertaining to the work created or developed in connection with the services provided pursuant to the agreement with Broward County including any copyright.
- 2) Ownership rights under the contract are rights to use, re-use, duplicate, or disclose text, data, drawings, and information, in whole or in part in any manner and for any purpose whatsoever without compensation to or approval from Consultant/Contractor.
- 3) BCAD will at all reasonable times have the right to inspect the work and will have access to and the right to make copies of the above-mentioned items.
- 4) All text, electronic digital files, data, and other products generated under this contract shall become the property of County except where otherwise limited within the Contract.
- 5) All files/drawings shall be furnished to BCAD upon request from BCAD.
- 6) No portion of any "application" (e.g. database, GIS portal, web application, or customized document or tool) developed for BCAD shall be used as a template for non Broward County projects unless the prior approval in writing is obtained from BCAD.

(K) BCAD-Furnished Materials to the Consultant/Contractor:

- 1) BCAD and Consultant/Contractor may make various electronic files available to the Contractor during the Pre-Construction and Construction phases of the Project. To this end, Consultant/Contractor shall make the following information available to the Contractor in electronic format:
 - a. Work-files: Selected work product files, reports, spreadsheets, databases, specifications, drawings and other documentation of

Consultant's/Contractor's work in progress may be provided to the Contractor, Managing General Contractor, or other County consultant on an as required basis. Consultant/Contractor shall cooperate and facilitate the exchange of these electronic media documents.

- b. Where electronic media submittals of final site surveys are required: Provide electronic copies of any existing site survey data already on electronic media.
- c. Where Electronic Project Record Documents are required, Consultant will provide the Contractor one set of AutoCAD electronic file format contract drawings, to be used for as-built drawings at the Contractor's option. Make electronic file drawings available on DVD/CD ROM media.
- d. BCAD will supply Consultant/Contractor with all necessary BCAD standard cover page and title block files and formats.

(L) Other Digital Information:

- 1) A variety of digital information may be generated by participants in the design process including BCAD, Consultant, sub consultants, Contractor, subcontractors; BCAD's commissioning authority, local jurisdictional authorities and other project team members.
- 2) Consultant/Contractor shall facilitate and participate wherever possible in this digital exchange of information by conforming to the standards expressed above.