

## **SECTION 4 EF: ELECTRONIC FILES**

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### **CAD DIVISION**

Latest Update 7-14-11, See underlined text

#### **PART I: GENERAL REQUIREMENTS**

##### **1. SCOPE:**

1.1. This division of the electronic files outlines the minimum requirements for computer aided design (CAD) deliverable standards and establishes the protocol for the creation of new electronic drawing files by UM design staff members, and architects, engineers, construction managers, contractors, etc. hired by UM for campus design projects. Hereinafter where inserted the term “contractor” shall represent Architects, engineers, construction managers, and contractors referenced herein.

##### **2. UM INTENT:**

2.1. It is UM's intent to have the contractors utilize our archive drawing files as a base line electronic file for all renovation projects thereby linking the renovation projects to each buildings archive file.

2.2. All contractors shall use AutoCAD Release 2004 Software or subsequent updated version for all projects at the UM campus. Firms who utilize Building Information Modeling (BIM) Software to generate electronic drawing files shall submit project electronic files in both the BIM Format, Revit Version 6.1 or later and in AutoCAD “dwg” file format noted above and herein.

##### **3. UM PROJECT DEFINITIONS:**

3.1. For these standards UM projects are defined as follows:

- a. **New Construction Projects:** These projects include new building construction, additions to campus existing buildings and/or renovation projects for buildings where existing electronic files are not available.
- b. **Renovation Projects to Existing Buildings:** These projects include various types of renovations ranging from small room revisions to complete floor renovations and revisions to the building infrastructure for plumbing, fire protection, HVAC, and electrical systems.

##### **4. COMPLIANCE WITH THESE STANDARDS:**

4.1. Compliance to these standards allows for the intelligence contained within the drawings to be readily transferred to the data systems used by UM. No variances to these standards will be allowed by UM.

- 4.2. All final electronic files created by contractors for submission to UM must comply with these CAD deliverable standards. The final electronic files for both new construction projects and renovation projects to existing buildings must be organized as outlined in part II below.
- 4.3. All final electronic files submitted to UM that are not in compliance with these CAD deliverable standards will be returned to the contractor for corrections. All corrective action will be completed by the contractor at no additional cost to UM. All files returned to the contractor must be corrected and returned to UM with in 30 days of receipt of files from UM.

## 5. ACCURACY:

- 5.1. Contractors are responsible for the accuracy of all CAD drawings delivered to UM. For all drawing entities all lines meet at intersections, straight lines are straight, and blocks are inserted properly without overlap.

## 6. OWNERSHIP:

- 6.1. UM, for itself and such others as it deems appropriate, will have unlimited rights to all information and materials developed under contract and furnished to UM. This includes any documentation thereof, reports and listings, and all other items pertaining to the work and services. Unlimited rights under this contract are rights to use, duplicate, or disclose data and information, in whole or in part, in any manner and for any purpose whatsoever without compensations to or approval from the contractor. UM 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. All digital files, associated data, and other products generated under the contract shall become the property of UM.

## 7. FILE FORMATS:

- 7.1. **General:** UM understands that “contractors” will utilize their own file formats to expedite the completion of electronic project files. However before the project files are turned over to UM, the files must be organized, labeled, etc, outlined in these standards.
- 7.2. **Drawing Files:** AutoCAD Drawing Files shall be readable “DWG” files and be in compliance with latest international standard classification IFC. The term “readable” means when UM and/or a contractor accesses the dwg file, the file opens without any errors, such as proxy, font substitution, xref resolution, etc., and the objects, layers, etc. in the file remain intact.
- 7.3. **BIM Files:** BIM drawing files shall be readable “RVT” files and be in compliance with latest international standard classification IFC. The term “readable” means when UM and / or a contractor accesses the dwg file, the file opens without any errors, such as proxy, font substitution, xref resolution, etc., and the objects, layers, etc. in the file remain intact.

**7.4. Other File Types:** When DWG or RVT file formats include images such as photos, doc files, excel spread sheets, etc. such images shall be inserted in the file as either a \*.TIF, \*.GIF, \*.JPG, \*.CALS, \*.PDF or \*.BMP only as raster images attached to the DWG or RVT File as a xref or imbedded file .

**8. UM ELECTRONIC FILES:**

**8.1. Electronic Files:** UM has a library of electronic drawing files for the buildings on Campus. This electronic library includes archive drawing files, and space inventory files for most of the Buildings on Campus and a set template files with standard sheet sizes.

**8.2. Archive Files:** UM archive drawing files, where they exist, were created by contractors for either new building projects or renovation projects to existing buildings and may include complete electronic files of the architectural, structural, mechanical, plumbing, fire protection, electrical and/or security system designs. These archive drawing files reflect the current condition of a building or facility, and when new projects are linked into these files, said files by their very nature become living documents that are continually updated. “Intelligent” facility drawings are the primary means of transferring facility data into UM computer integrated applications such as computer aided facilities management (CAFM) and computer maintenance management software (CMMS).

**8.3. Space Assignment Files:** UM space assignment drawings include floor plans, square footages, room numbers and titles, etc. and are generally used for conveying occupancy information. For some campus buildings this file may be the only electronic file on record.

**8.4. Template Files:** UM Sheet Template Files shall be utilized for all UM Projects as follows:

a. **Sheet Size ‘A’:** 8.5 x 11 Template File.

b. **Sheet Size ‘B’:** 11 x 17 Template File.

c. **Sheet Size ‘C’:** 18 x 24 Template File.

d. **Sheet Size ‘D’:** 24 x 36 Template File.

e. **Sheet Size ‘E’:** 30 x 42 Template File.

f. **Sheet Size ‘F’:** 36 x 48 Template File.

g. The UM standard drawing templates can be accessed through the UM web page address included in Section 2 of these Design Standards.

**END OF SECTION 4 CAD - PART I**