

UMB A/E DESIGN STANDARDS – CHAPTER 4 EF – ELECTRONIC FILES – CAD DIVISION

PART 2: PROJECT FILE ORGANIZATION –

Amended 09-19-2022, See underlined text

1. SCOPE:

- 1.1. This part outlines the requirements for the organization of the Electronic Drawing Files for all UMB Projects.

2. FILE TYPES:

- 2.1. **Electronic Files:** UMB requires up to three (3) types of electronic deliverable files for all projects at UMB. The file types are CAD “dwg” files, Adobe “pdf” files and/or BIM/Revit “rvt” files.

- a. **AutoCAD Files (DWG Format):** Each cadd file shall house an individual drawing. The use of multiple drawings in one cad file is prohibited.
- b. **Adobe Files:** Each cadd file shall be converted to a pdf file. Each pdf file shall include bookmarks, searchable text and be legible where drawing line weights and symbols are clearly shown and do not appear as solid blotches.
 - (1) **Bookmarks for Submitted Pdf Files:** Bookmarks for submitted pdf files shall agree with the UMB Standard Bookmarks. See Section 5 Appendices for bookmark requirements.
- c. **BIM/Revit Files:** BIM/Revit files shall include individual “rvt” files for each drawing created for the project.
- d. **Cover Sheets and Borders:** The contractor shall utilize the UMB Standard template files for all cover sheets and borders.

3. FILE NAMES:

- 3.1. **AutoCAD and Revit Drawings File Names:** The file names shall follow the requirements in Chapter 2 of this manual. See examples below:

- a. Renovation Projects:
 - (1) AD100 – Second Floor Demolition Plan.dwg
 - (2) A100 – Second Floor Plan.dwg
 - (3) MD100 – Second Floor Demolition Plan – HVAC.dwg
 - (4) MD200 – Second Floor Demolition Plan – HVAC Piping
 - (5) M200 – Second Floor Plan – HVAC Piping
 - (6) PD100 – Second Floor Demolition Plan – Plumbing.dwg
 - (7) P100 – Second Floor Plan – Plumbing.dwg
 - (8) FPD100 – Second Floor Demolition Plan – Sprinkler.dwg
 - (9) FP100 – Second Floor Plan – Sprinkler.dwg
 - (10) ED100 – Second Floor Demolition Plan – Power.dwg
 - (11) E100 – Second Floor Plan – Power.dwg
 - (12) ED200 – Second Floor Demolition Plan – Lighting.dwg

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(13) E200 – Second Floor Plan – Lighting.dwg

b. New Projects:

(1) A100 – First Floor Plan.dwg

(2) M200 – First Floor Plan – HVAC Piping

(3) P100 – First Floor Plan – Plumbing.dwg

(4) FP100 – First Floor Plan – Sprinkler.dwg

(5) E100 – First Floor Plan – Power.dwg

(6) E200 – First Floor Plan – Lighting.dwg

c. For a complete list of drawing numbers and titles see “UMB Standard Sheet Numbers and Sheet Titles on the UMB Design and Construction Web Site.

3.2. Adobe File Names: PDF files names shall match the drawing number.

4. DRAWING ASSEMBLY AND ORGANIZATION:

4.1. AutoCAD DWG Files: The AutoCAD drawing files shall include reference drawings (xrefs) and a sheet file. The contractor shall utilize the UMB Standard CAD Template Files for all cover sheets and borders.

a. **Reference Files (Xrefs):** Xrefs help to organize drawing information, enhance coordination, and minimize redundant data. The xref path shall not include drives or directory designations and the xref is placed on layer G-ANNO-REFR and locked.

(1) All xrefs shall be inserted into a sheet file as an attachment or overlay

(2) Do not bind the xrefs to the sheet files.

(3) UMB’s title block shall be referenced into a sheet file in paper space. The text/ attributes shall be inserted as a separate entity from the title block.

b. **Sheet Files:** The Sheet drawings shall contain all annotation, text, schedules, notes, drawing titles (in paper space) and dimensions (in model space).

c. **Purge the Drawings:** Each drawing shall be free of unused blocks, dimensions styles, layers, line types, plot styles, text styles, etc.

4.2. UMB CAD Templates: The contractor shall use the UMB Standard CAD Templates for all projects. The templates include a Cover Sheet, Title Block and UMB Logo(s).

4.3. Layering: UMB has adopted the latest AIA CAD Layer Guidelines for layer naming only.

a. **Layer Colors:** All entities shall be assigned a color by layer.

b. **Line-weights and line-types:** All entities shall be assigned a line-weight and line-type by layer.

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- 4.4. Text and Fonts:** Use only standard Autodesk Architectural Desktop or approved True Type fonts.
- a. Text used for drawing notation shall be a minimum of one eighth (1/8) inch high.
 - b. Text used as “Titles” shall be a minimum of one quarter (1/4) inch high.
 - c. Text width shall be set to one 1.00.
- 4.5. Line Types:** If line types other than standard Autodesk® line types are used the *.LIN file must be provided with the submission.
- 4.6. Units and Scale:**
- a. **Units:** Imperial units shall be the standard system of measurement used unless otherwise specified.
 - b. **Scale:** Architectural units shall be used for all floor plans, sections and details with the exception of civil drawings. They shall utilize the engineering scale.
- 4.7. Plan Drawings:** Create a separate sheet file for each drawing. Use sheet files to combine floor plans with non-plan information or multiple elevations. Do not combine several drawings such as elevations, sections, and details in one model file. When a floor plan is too large to fit on a single sheet at the desired scale; use viewports in separate sheet files to show portions of the floor. Do not create individual model files for portions of a floor.
- 4.8. Column Grids and Designations:** Each discipline shall use the same column grids and designations as developed by the prime consultant. The column grids and designations shall be grayed out and remain visible in the background so as not to conflict with the work represented by the discipline.
- a. **Renovation Projects:** When projects include renovations to existing buildings the column grids and designations shall match the existing structure.
- 4.9. Dimensioning:** All dimensions shall update automatically when the distance they are measuring changes (associative dimensioning).
- 4.10. Drawing Limits:** Do not set the limits any larger than necessary to accommodate the drawing. No entities shall be located outside the drawing limits.
- 4.11. Drawing Origin:** Organize drawings in model space so that the lower left intersection of the outermost column lines that remain constant on most floors is placed at 0, 0, 0. In order to ensure proper insertion of xrefs and the stacking of floor plans, the origin point for an entire building must be consistent between model files. Once the origin is established, it cannot be changed. For sheet files, place the lower left corner of the sheet at 0, 0, 0.
- 4.12. Attributes:** Attributes may be used to store data in the drawing. Do not use attributes to store large amounts of data (greater than 10% of drawing size) or types of data that are better stored in external databases. UMB requires the use of an attributed title block and a model file attributed block to store descriptive data about the drawings; see title blocks.

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- 4.13. Blocks:** Any graphic entity that occurs repeatedly in drawings should be made into a block. Attributes contained within a block should pertain to the current project. Insertion points for each block shall be consistent with its placement in the drawing. Use logical insertion points such as the center of a circle, bottom left corner of an object, etc. Keep names simple and descriptive. Purge all unused blocks from the drawing. Nested blocks are permitted but should be avoided whenever possible. If nested blocks are used, they must be documented on the project and drawing documentation form (see Section 3 Deliverable Requirements). Draw objects used to create blocks on layer zero (0) so the block inherits the properties of the layer on which it is inserted. Do not insert blocks on layer zero (0). When drawing files are submitted no objects shall be placed on layer zero (0) unless otherwise specified.
- 4.14. Xrefs:** Autodesk Architectural Desktop term for external reference. Xrefs help to organize drawing information, enhance coordination, and minimize redundant data. The xref path shall not include drives or directory designations and the xref is placed on layer G-ANNO-REFR and locked. Document the relationship between drawing file and xref on the project documentation report and deliverables matrix.
- 4.15. Graphic Standards:** Drawing standards and symbols shall be in accordance with the AIA Architectural Graphic Standards. The U.S. National CAD Standard is also a good reference for drawing symbols, details, and guidelines.
- 4.16. Hatching:** Do not use polylines with increased width for poché or hatching. All hatching shall be associative.
- 4.17. Key Plan:** G-SITE is the layer on which the key site plan should be drawn.
- 4.18. Project Area Information:** As part of the project electronic files, the A/E shall outline the project areas as follows:
- a. **Gross Square Footage:** On layer A-Area-Space-GSF outline the perimeter of the project area with a continuous poly line to identify the project gross square footage.
 - b. **Individual Square Footage:** On layer A-Area outline each space in the project area with a continuous poly line to identify the square footage of each space. The individual spaces shall include all occupied spaces, storage areas, toilet rooms, stairwells, elevator shafts, janitor closets, mechanical and electrical rooms and shafts, corridors, and lobby's.
- 4.19. E Transmit:** Use the E transmit command to combine all required associated files into a single "zip" file for each "dwg" file prior to forwarding the file to UMB. Associated files shall include external references, fonts, and plot styles for each file.

END OF CHAPTER 6 – ELECTRONIC FILES – CAD DIVISION – PART 2