**SECTION 01 33 10: COMPUTER AIDED DESIGN (CAD) &
BUILDING INFORMATION MODELING (BIM) DELIVERABLE GUIDELINES**

1.   **GENERAL**

A.   These guidelines will ensure that work produced for the Owner will integrate into existing CAD files.

B.   At the start of the project, a CAD coordination meeting will be held between the Owner and those producing CAD files to review these guidelines and identify any specific concerns. This includes determination of BIM versus 2D requirements, room numbering process, and equipment asset tagging and inventory. The expected authorized use of the BIM model and software versions should also be discussed.

C.   CAD files (building plans and base maps) are available for use from the Owner

Disclaimer: All CAD files provided by the Owner are the "Best Available" at the time of transfer and are for information only. Field verify data as necessary prior to the commencement of any work to ensure accuracy. Floor plan access is intended only for the use by the individual or entity to which it is provided. Any dissemination, distribution, or copying is strictly prohibited without prior written consent from Brown University Facilities Management.

2.   **ELECTRONIC DELIVERABLES**

A.   PDF: Deliver all drawing sheets in Adobe's Portable Document Format (.pdf). Submit one PDF file for each drawing sheet. The PDF document size is to be the same as the full size drawing sheet size. PDFs should be produced from the native program of origin wherever possible; NO scanned images.

B.   EXCEL: A drawing index will be supplied in Microsoft Excel Format (.xls). The Excel document will contain separate columns with document attributes as follows: drawing title, revision date, sheet number and discipline. This document will contain all drawings in the "record" set. A template will be supplied.

C.   TRANSMISSION: When a large amount of files are to be submitted, files may be compressed using ZIP format

D.   MEDIA: Transmit files via flash drive (preferred), CD, SFTP, email or alternate agreed upon cloud storage solution.

3.   **2D CAD DELIVERABLES**

A.   FORMAT: Deliver all drawing files in Autodesk's AutoCAD native drawing (.dwg) format. Brown will accept drawings up to two versions older than the current release version of AutoCAD. Each sheet in the drawing set must be saved as an individual file. Multiple drawing sheets combined and saved in a single file will not be accepted.

B.   SUPPORT FILES: Deliver all CAD Support files necessary to recreate output that matches hard copy submittals. Support files include, but are not limited to, the following: External References (XRefs), Plot configurations (.ctb, .pc3), blocks, write blocks, images (logos), shapes (.shx) and fonts. Deliver files to the Owner free of any copyrighted or other material whose distribution is prohibited.

C.   SUPPORT DOCUMENTATION: Provide support documentation in text (.txt) or MS-Word Document (.docx) format. Support documentation includes, but is not limited to, the following: List of all layers, layer descriptions, an index matching each CAD file name to the corresponding drawing sheet, and any other special circumstances that warrant further clarification.

D.   LAYERING: Follow AIA CAD Layer Guidelines. Objects are logically grouped together similar entities will be on their own layers within the CAD files. The ability to isolate any set of similar entities must be maintained. Define all entities by layer and not by entity type (e.g. Color and Linetype will be defined as "ByLayer"). Save all drawing files in a 'plot ready state' (i.e. Layer information not shown on the final output must be frozen or purged).

E.   EXTERNAL REFERENCE FILES (XRefs): Each XRef file will have an insertion point of 0, 0, 0; Scale factor of 1; Rotation angle of 0; and reside on a separate layer within the dependent file. In addition, XRef files must be included with each submittal and be located in the same directory as the dependent file. The 'Insert' and 'Bind' options for XRefs will not be accepted.

F.   PAPER SPACE/MODEL SPACE-TABS & PLOTTING LAYOUTS: Each sheet of the drawing set will have one corresponding DWG file. The geometry contained in a file will be in Model Space at full scale. Use Paper Space primarily for setting up the appropriate output size, appearance, border, and title block information. Model Space entities will not be dimensioned or labeled in Paper Space. Plotting Tab names in Paper Space will clearly delineate the intended output for that tab and be consistent between drawings. (tab name '24x36L' for landscape 24"x36"). Plotting in Paper Space will be at a scale of 1 to 1.

G.   MAPPING: Mapping files must align with the Rhode Island State Plane Coordinate System as defined in the Brown University Survey Control Standards. In general, all files must reference each other with an insertion point of 0, 0, 0, scale factor of 1, and rotation angle of 0. Files that do not align with the Owner's mapping files will not be accepted and will require resubmittal.

4.   3D BIM/CAD DELIVERABLES

A.   FORMAT: Deliver all drawing files in Autodesk Revit (native .rvt) drawing formats. Brown will accept drawings up to two versions older than the current release version of Autodesk Revit. This is in accordance with Autodesk's software retirement program. The version of Autodesk Revit, defined by the design team, used from the start of the project must remain a constant throughout the life of the project.

B.   SUPPORT FILES: Deliver all assets necessary to recreate output that matches hard copy submittals. Support files include, but are not limited to, the following: AutoCAD native drawing files (.dwg), Images (.jpg) and External Links. Deliver files to the Owner free of any copyrighted or other material whose distribution is prohibited. Autodesk Navisworks files can also be part of the deliverables.

C.   LEVEL OF DEVELOPMENT (LOD): Final model deliverables are to be LOD 300 or higher, per AIA Document G202 (r2013).

5. GENERAL FILE STANDARDS

    A.   COMPONENTS: All models & component families must follow logical grouping and naming conventions.

    B.   MODEL VIEWS: Model views must be sorted by floor, prefixed with the corresponding floor level and description, as to display and sort in logical order.

    C.   SHEET VIEWS: All sheet views must be prefixed with the corresponding sheet number, logically ordered in a plot-ready state.

6. ROOM TAGS

    A.   For projects where there are changes to existing room layouts, contact the Facilities Information Manager (FIM) for the assignment of official Brown University room numbers

    B.   Submit floor plans (CAD, pdf or hard copy) for numbering no later than the end of schematic design so the appropriate Brown room numbers can be included on all design and construction documents.

7. GENERAL DRAWING REQUIRMENTS

    A.   SHEET REQUIREMENTS: Drawing sets will have consistent sheet sizes
                Standard Sheet Size: ARCH D (ARCH 4) – 24"x36"
                Maximum Paper Size: ARCH E1 (ARCH 5) – 30"x42"

    B.   TITLE BLOCK: The title block will include, but not be limited to, the following information:
- Title – Includes facility name, floor and room numbers as applicable
- Owner's project name and number
- Sheet number
- Drawing file name
- Revision history – revision number and date
- Drawing Phase – BID, CONSTRUCTION, AS-BUILT, etc.
- Architect, engineer, consultant, contractor, and/or sub-consultant

8. ACCEPTANCE OF ELECTRONIC DELIVERABLES

    A.   Brown will review electronic file deliverables for compliance with these guidelines prior to acceptance. Files that do not meet these guidelines will require resubmittal.