

# Yale

## Office of Facilities

### CAD STANDARDS

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## **INTRODUCTION**

Yale University uses Computer Aided Drafting (CAD) as a tool to manage information, which is essential to the professional staff that oversees our facilities. For each floor of a facility, the University maintains or requires creation of a CAD Record Condition Assignment Plan that will be updated, as changes occur to reflect current building conditions. In addition to CAD Record Condition Assignment Plans, CAD Record Condition Construction Drawings will be required on Capital Projects and Non-Capital Projects. CAD Record Condition Drawings will not be updated as building changes occur. **All CAD Record Condition Assignment Plans and CAD Record Condition Construction Drawings submitted to Yale University must conform to the Drawing Standards and be submitted as described in the Deliverables.**

## **UNIVERSITY PRIORITIES FOR CAD DRAWINGS**

CAD drawings will be created for University facilities according to the following priorities:

1. For all new construction and additions (Capital and Non-Capital): the Consultant will create CAD Record Condition Construction Drawings and create CAD Record Condition Assignment Plans.
2. For all major renovations to existing buildings (Capital): the Consultant will create CAD Record Condition Construction Drawings and create or update CAD Record Condition Assignment Plans.
3. For all minor renovations to existing buildings (Non-Capital): the Consultant will create CAD Record Condition Construction Drawings and create or update CAD Record Condition Assignment Plans.
4. For existing buildings in which there are no active or upcoming projects: CAD Archive Assignment Plans will be created as resources and time permit.

## **PROJECT PROCESS**

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Yale University processes on CAD-based projects are as follows:

1. The Yale Project Manager and the Manager of Information Resources will meet prior to the development of the RFP to identify the available CAD data and determine whether CAD requirements differ from what is specified in this document.
2. The Yale Project Manager will provide this information to the Consultant in the RFP. Contract Administration will provide a copy of the current CAD Standards with the RFP.
3. If the Consultant has any questions about the CAD requirements (s)he will contact the Yale Project Manager. The Project Manager will answer those questions or refer them to the Manager of Information Resources. If there are many questions to resolve, the Project Manager may choose to have a CAD kick-off meeting.
4. As part of the Architect's Basic Services, preparation and delivery of the CAD Record Documents will be in accordance with the AGREEMENT BETWEEN OWNER AND ARCHITECT.
5. At the end of the project the Consultant will provide the Project Deliverables to the Project Manager. The Project Manager will give the Project Deliverables to the Manager of Information Resources, who will review them for compliance with Yale University CAD Standards. The Manager of Information Resources will inform the Project Manager whether the deliverables comply or not and clearly document any problems. It is recommended that a preliminary submittal be sent for review to avoid formatting issues. Updated assignment plans should also be sent to the Manager of Space Management & Information Systems on Central or Medical Campuses.
6. The Project Manager will work with the Consultant to quickly resolve deliverable compliancy issues. Before a project can be closed out and final payment issued, all project deliverables must be submitted and approved by the Project Manager.

## **DRAWING STANDARDS**

**CAD Record Condition Construction Drawings** are detailed drawings that depict the work involved on a specific project and also reflect field changes recorded by the contractor during construction. Standards for these drawings are very basic. CAD Record Condition Construction Drawings must contain the Yale title block and be delivered to Yale University in AutoCAD Release 2016 or later. It is recommended but not required to conform to the AIA CAD Layer Guidelines. Consultants are strongly encouraged to consider the CAD Archive Assignment Plan layering standards when creating the CAD Archive Construction Drawings.

Please adhere to the following standards when preparing the drawings for delivery:

1. Documents should be grouped by discipline in separate folders.
2. DWG files must not contain xrefs, specialty fonts, or multiple layout tabs. Any images, tables, or spreadsheets *must* be embedded or bound.
3. A DWG file shall be included for each paper drawing delivered.
4. A single PDF of each drawing shall be included.
5. A fully populated Table of Contents file will be included in Excel format. See Exhibit A. A template will be supplied.
6. File names need to include sheet/drawing number e.g. A1.DWG, A1.2.DWG.
7. Drawings shall be purged of all unreferenced data e.g. layers, blocks, and fonts.
8. Yale title blocks must be fully populated containing the Yale project number and labeled Record Condition. Title blocks templates can be downloaded from the Facilities website. <http://www.facilities.yale.edu/documents-resources/design-standards>
9. All room numbers must be assigned by our University Planning department. Floor & Room Numbering Standards and Process can be downloaded from the Facilities website. <http://www.facilities.yale.edu/documents-resources/design-standards>
10. New work area should be prominent in the drawings by using revision clouds or gray scaling the existing plan.
11. Paper drawings shall be delivered *no* larger than E-size (36X48) paper.
12. Revision section of the title block must be fully populated.
13. If a project utilizes Building Information Modeling (BIM), the model shall be delivered on a CD/DVD or USB Flash Drive and be Navisworks compatible. In addition, if BIM drawings are to be used for Record Condition DWG files they should show the same content as the Construction Drawings and be legible. These DWG files must be approved by Information Resources for use as Record Condition. Sample files shall be provided to the University of each discipline.

**CAD Record Condition Assignment Plans** are architectural floor plans formatted to be printed on 11"x17" paper with room numbers, room uses (i.e. classroom, office), room square footage, and floor square footage. Roof plans are included in this group. Record Condition Assignment Plans reflect field changes recorded by the contractor during construction. The content and organization of an Archive Assignment Plan are defined in Layering Standards Exhibit B. An example of an Archive Assignment Plan is provided in Exhibit C. Templates can be sent upon request.

Please adhere to the following standards when preparing the Assignment Plans for delivery:

1. All items listed in Exhibit B – LAYERING STANDARDS are to be drawn on the layers specified. All drawing elements are to be color BYLAYER and linetype BYLAYER, unless noted below. All other layers will be purged from the file.
2. Each Assignment Plan, including sub-basements, mezzanines, intermediate levels, attics, and roofs must be a separate CAD file. Building plans must stack properly above one another (with an insertion point of 0,0,0).
3. Yale title blocks and graphics symbols (blocks) must be used and scaled accordingly. These are available on the Facilities website.
4. If you are modifying an existing Assignment Plan provided by the University, maintain the plotting scale established in that file. Assignment Plans are plotted at 11"x17". Exceptions are required for large buildings. If you are creating new Assignment Plans or if you have any questions about drawing scale, contact the Information Resources Manager from the Office of Facilities immediately to establish the appropriate scale. (See Deliverables section below for Manager of Information Resources contact information)
5. All text included in an Assignment Plan must match the fonts included in the prototype Assignment Plan. See Exhibit C. FMGRM1 block is to be used for all room/space notations. All room numbers must be coordinated with Yale University Space Database. Please contact University Planning to set room numbers.
6. The boundary of the area that was modified as a result of your project must be clearly identified and annotated on layer A-PFLR-TEXT. Use the linetype DASHED for this entity only.
7. All new room/space area polylines must conform to the Post Secondary Education Facilities Inventory and Classification Manual standards. For further clarification regarding area calculations, please contact the Manager of Information Resources.

## **DELIVERABLES**

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All CAD Record Condition Assignment Plans and CAD Record Condition Construction Drawings are required to be submitted in both electronic and paper-based formats. All Record Specifications, Submittals & Equipment Manuals, Warranty Letters, and other project close-out information needs to be delivered in a *bookmarked* (by table of contents) PDF file and hard copy format. Please check with the Yale Project Manager for a complete list of deliverables required for your project.

1. All Record Condition drawing files are to be provided in AutoCAD Release 2016 DWG file format and submitted on CD/DVD or USB Flash Drive. All Specification, Submittal & Equipment Manuals, Warranty Letters, and other project close-out related material are to be provided in PDF format and submitted on CD/DVD or USB Flash Drive. The primary design professional will coordinate the deliverables for all other consultants and deliver the project in its entirety. All CAD Record Condition Construction Drawings electronic file submissions should be formatted as follows:
  - a) One full size paper set of Record Condition drawings.
  - b) One CD/DVD or USB Flash Drive containing a complete set of DWG and PDF drawings separated by discipline with a table of contents file.
  - c) One CD/DVD or USB Flash Drive containing bookmarked PDF files of all Submittal & Equipment Manuals, Record Condition Specifications, Warranties, and all other deliverables required by the Project Manager.
  - d) All deliverables must be accompanied by a Plan Room Transmittal/Check List when brought to the Plan Room.
2. Each paper-based CAD Archive Assignment Plan drawing must be plotted with all layers of the file displayed on 11"x17" paper. Each paper-based CAD Record Condition drawing must be plotted to reflect the full contents of the record set. The number of plots and media type must comply with the terms of the Contract.
3. There will be a twelve-month period from the date that Yale University receives the CAD files in which the University can review the CAD files for errors and can resubmit the files to the Consultant for corrections *at no charge to the University*.

For questions concerning translations between AutoCAD and other CAD packages, FTP site address or any other CAD-related issues not covered in these standards, please contact:

Yale Central Campus, Yale School of Medicine, & West Campus

David Kula

Manager of Information Resources

2 Whitney Avenue

P.O. Box 208297

New Haven, CT 06520-8297

Voice (203) 432-6817

FAX (203) 432-8881

e.mail: [david.kula@yale.edu](mailto:david.kula@yale.edu)

## **EXHIBIT- A**

### **Table of Contents Template (for Office of Facilities Deliverables)**

**Date:** 8/31/12  
**Building Name:** Saybrook College  
**Facility ID:** 2500  
**Yale Project Number:** 98022369  
**Yale Project Name:** Saybrook College Renovation  
**Yale Project Manager:** John Doe  
  
**Drawing Set Type:** Archive Construction Drawings

<b>Drawing/Sheet Number</b>	<b>CAD File Name</b>	<b>Drawing/Sheet Description</b>
Cover Sheet	CoverSheet.DWG	Cover Sheet
Cover Sheet	CoverSheet.PDF	Cover Sheet
2500A101	2500A101.DWG	First Floor Plan
2500A101	2500A101.PDF	First Floor Plan



**EXHIBIT- B****LAYERING STANDARDS**

<b>ASSIGNMENT PLANS</b>			
<b>ALL LAYER NAME</b>	<b>COLOR</b>	<b>LINETYPE</b>	<b>LAYER CONTENTS</b>
0	7	CONTINUOUS	<b>Assignment Plans include the following:</b> Required AutoCAD layer
A-WALL-EXTR	8	CONTINUOUS	Exterior walls
A-WALL-INT	6	CONTINUOUS	Interior walls (inc. fixed partitions)
A-WALL-PRHT	12	CONTINUOUS	Partial height fixed walls with wall heights indicated (not reflected on the ceiling plan)
A-WALL-MOVE	11	CONTINUOUS	Moveable partitions
A-DOOR	1	CONTINUOUS	Doors
A-GLAZ	4	CONTINUOUS	Windows
A-FURN -FIXT	2	CONTINUOUS	Fixed seating, fixed book stacks
A-AREA	10	CONTINUOUS	Floor gross square ft.
A-SHBD	13	CONTINUOUS	Title Block
A-PFLR-SYMB	1	CONTINUOUS	North arrow, graphic scale, key plan (when required)
A-PFLR-TEXT	7	DOTTED	Identification of area of plan modified by the current project
A-PFLR-TTLB	13	CONTINUOUS	Drawing title, number and scale, building name and address, facility ID number, date, general assignment plan text
A-AREA-PLIN	7	CONTINUOUS	Room outlines (must be polylines), workstation outlines per PEFICM standards
A-DWFS-SHBD	13	CONTINUOUS	DWF Title Block for web reporting
A-DWFS-TTLB	13	CONTINUOUS	DWF report title
A-DWFS-VPORT	7	CONTINUOUS	DWF report viewport
A-FLOR-DAT1	7	CONTINUOUS	SmartBlock room names
A-FLOR-DAT2	7	CONTINUOUS	SmartBlock room areas
A-FLOR-RMNO	7	CONTINUOUS	SmartBlock room numbers
A-FLOR-RMDR	7	CONTINUOUS	SmartBlock room number located in doorway
A-FLOR-LEGN	7	CONTINUOUS	Legend for space attribute reporting
A-FLOR-PFIX	5	CONTINUOUS	Toilet and lavatory fixtures including partitions
A-FLOR-ROOM	7	CONTINUOUS	Leaders
A-FLOR-CASE	11	CONTINUOUS	Built in furniture
A-FLOR-CASE-LAB	15	CONTINUOUS	Lab Benches and lab fixtures
A-FLOR-IDEN	4	CONTINUOUS	Misc text
A-FLOR-OTLN	9	CONTINUOUS	Floor polyline for floors GSF calculations
A-FLOR-OTLN-OPEN	2	CONTINUOUS	Open to below
A-FLOR-STRS	3	CONTINUOUS	Stairs, fire escapes, ramps, elevators, shafts
A-COLS	2	CONTINUOUS	All known structural elements
C-PSIT	10	CONTINUOUS	Ground floor only: Main and other entrance indicators, handicap-accessible entrance symbols, names of abutting streets and buildings <sup>6</sup>
A-ROOM-BNDY	253	DASHED	Room boundary when not defined by walls

Yale University Office of Facilities CAD Standards

<b>ALL LAYER NAME</b>	<b>COLOR</b>	<b>LINETYPE</b>	<b>LAYER CONTENTS</b> <b>Assignment Plans include the following:</b>
A-CLNG-ACCS	2	DASHED	Ceiling access, pull down attic stairs
A-ROOF	8	CONTINUOUS	Roof penetrations, parapets, ridges, valleys, roof pitch lines, slopes, drains, roofing material identification
A-ROOF-OTLN	1	CONTINUOUS	Roof outlines, roof square footage
A-PROF-TTLB	13	CONTINUOUS	Title block and legend information for the Roof Plan, roof plan text
A-EQPM	4	CONTINUOUS	Fixed Equipment
A-FLOR-WIPE	255	CONTINUOUS	Wipeout for SmartBlock text
A-SEP-LINE	3	CONTINUOUS	Building Separation Lines
A-EQPM-LAB	10	CONTINUOUS	Fume hoods, Cage wash, Cold rooms

**EXHIBIT- C**



