



CAD Standards

Facility and Contract Documentation



TABLE OF CONTENTS

INTRODUCTION

1. QUALITY ASSURANCE CHECKLIST

2. CAD PRODUCTION

- **FILE SETUP and FORMATTING**

- File Format
- Scale and Tolerances
- Text and Font Types
- Block
- Title Block
- Disclaimer Use
- Model Space and Paper Space
- External Reference Files

- **LAYERING**

- Layer List
- Name Formatting
- General Use
- Attributes (Colors, Pens, Linetypes)

- **FILE NAME CONVENTIONS**

- Building Identification Codes
- Discipline Identification Codes
- Drawing Type Codes
- Drawing Numbering

- **CAD FILE TRANSLATION**

- AutoCAD Compliance
- Translation Testing Recommended



INTRODUCTION

The purpose of this document is to serve as a guideline specification for producing and delivering CAD drawings for Contract Documents. Prior to final payment, all specified materials must be submitted to the Project Manager or their representative in accordance with these standards. A signed copy of the Quality Assurance Checklist must be submitted with CAD drawings and scans being delivered during the closeout phase of all projects.



SECTION 1.0.0 – CAD QUALITY ASSURANCE CHECKLIST

CAD drawings delivered upon closeout of a project must be accompanied by submission of the following checklist. When a checklist has been signed and submitted, the design professional (Architect, Engineer, Contractor, etc.) is assuring that all materials adhere to the standards and guidelines set forth in this document.

FILE FORMAT AND SETUP

- Electronic File Format
- Scale, Units, & Tolerances
- Fonts and Text Styles
- Blocks
- Title Blocks
- Policy on Model Space and Paper Space
- Policy on External Reference Files (XREFs)

LAYERING

- Standard Layer List
- Layer Name Formatting
- General Rules about Naming and Uses
- Layer Attributes (Colors, Pens, Line types)

CAD & TIFF FILE NAME CONVENTIONS

- Building and Floor Identification Codes
- Discipline Identification Codes
- Drawing Type Codes
- Drawing Numbers

POLICY ON CAD FILE TRANSLATION

- Full AutoCAD Compliance
- Translation Testing Procedures (if applicable)

POLICY ON TIFF FILE TRANSLATION

- Scan at 600 dpi
- Files must be uncompressed

Signature of Accountable Design Professional Representative _____

Print Design Professional's Name _____

Email Address _____

Phone Number _____

Date _____



SECTION 2.0.0 – CAD DRAWING PRODUCTION FILE FORMAT and SETUP

Electronic File Format

Construction project drawings must be submitted to Oklahoma State University in full compliance with AutoCAD 2006 software (file extension = .DWG). The use of the name AutoCAD always implies “AutoCAD 2006” unless noted otherwise.

Scale and Units

All CAD drawing shall be drafted at full scale in architectural units (one drawing unit equals one inch).

Tolerances

Exterior building dimensions recorded within CAD drawings must reconcile to within 1 inch of actual building dimensions as measured in the field and interior building dimensions must reconcile to within 1/2 inch of actual field dimensions. Please confirm any dimension error tolerances for each project with your Oklahoma State University representative.

Fonts & Text Styles

ROMANS.shx is the only font approved for use. Any text style using this font would be allowed. Dimensions, labels and notes shall not appear larger than 1/4” or smaller than 1/8” height on printed drawings. Drawing titles should not appear larger than 1/2” height on printed drawings. Special fonts which are not packaged with AutoCAD are not allowed. Dimensions, labels and notes, should not be less than 1/8” height on printed drawings.

Blocks

All entities within a block must be created on layer 0. Drawing entities translated into AutoCAD blocks from non-AutoCAD systems must revert to layer 0 when exploded within AutoCAD. File translation from non-AutoCAD systems which result in wall blocks within AutoCAD are unacceptable.

Title blocks

Each CAD file submitted shall have only one title block. If using paper space, the title block shall be placed with its lower left hand corner point inserted at a coordinate location of (0,0,0).

The drawing’s title block shall contain certain essential information that Oklahoma State University needs to store and retrieve each drawing in its library.

Title blocks for each Oklahoma State University faculty or department may have its own title block that it would like to see matched with drawings of facilities that it owns.

Title blocks for construction drawings by consulting Architects and Engineers must use the Oklahoma State University title block template.

Title blocks shall contain all of the information listed below:

Project Information:

- Firm Name - representing the drawing author.
- Project Name - as specified by Oklahoma State University
- Building Number - as specified by Oklahoma State University
- Building Name - specify only if the project name does not include this information.



Drawing Information:

- Drawing Title - indicating the drawing content, e.g. floor plan, section, detail, etc.
- Drawing Number
- Date of Drawing - original drawing date including significant revision dates.
- Drawing Scale - representing the plot scale of the drawing with title block.
- North Arrow

Policy on Model Space and Paper Space

Oklahoma State University requires that each CAD file submitted as a project deliverable contains only one drawing model with one title block, using either of the following setup methods.

Method #1 -- *Model Space Only*. Both the drawing model and the drawing's title block are contained in the same model space environment within a single CAD file. The paper space environment is not used.

Method #2 -- *Model Space and Paper Space Combined*. Each CAD file is set up to contain only one title block in paper space which references the building model contained in model space.

Policy on External Reference Files (XREFs)

Oklahoma State University will not accept the submission of any CAD drawing deliverable which contains references to external source drawing files. All externally referenced data sources that were used during the CAD drawing production phase shall be inserted and retained as a block within a single drawing file, including the title block, upon project completion and prior to drawing delivery to Oklahoma State University.

LAYERING

The Oklahoma State University Layer Standard is based on the " The American Institute of Architects (AIA), Construction Specifications Institute (CSI), and National Institute of Building Sciences (NIBS) United States National CAD Standard® (NCS) Version 4.0, released in 2008.

Standard Layer Listing

This section contains a partial list of AIA recommended layers to be used when producing construction drawings for Oklahoma State University.

Name	Description	Color	Line weight	Line type
Architectural				
A-ANNO-TEXT	General Text	4-cyan		continuous
A-CLNG	Ceiling information			continuous
A-DOOR	Doors	2-yellow		continuous
A-FLOR	Floor information			continuous
A-FLOR-CASE	Casework (manufactured cabinets)			continuous
A-FLOR-EVTR	Elevator cars and equipment	2-yellow		continuous
A-FLOR-STRS	Stair treads, escalators, ladders	2-yellow		continuous
A-FLOR-TPTN	Toilet partitions			continuous
A-GLAZ	Windows, curtain walls, glazed partitions	2-yellow		continuous
A-ROOF	Roof	1-red		continuous
A-WALL-INTR	Interior Building Wall	9-lt grey		continuous
A-WALL-EXTR	Exterior Building Wall	7-white		continuous
A-WALL-PRHT	Partial-height walls (on floor plans only)	2-yellow		continuous



Interior

I-ANNO-TEXT	General Text	4-cyan	continuous
I-EQPM	Equipment		continuous
I-FURN	Furniture	1-red	continuous
I-FURN-CASE	Cabinetry / casement	1-red	continuous

Plumbing

P-ANNO-TEXT	General Text	4-cyan	continuous
P-FIXT	Plumbing fixtures, toilets, sinks	3-green	continuous

Structural

S-ANNO-TEXT	General Text	4-cyan	continuous
S-BEAM	Beams		continuous
S-COLS	Columns	6-magenta	continuous
S-GRID	Column grid	6-magenta	continuous

University

U-ANNO-TEXT	General Text	4-cyan	continuous
U-ANNO-TTLB	Border and University Title Block	7-white	continuous
U-ANNO-NPLT	Construction lines, none plotting information, viewports	7-white	continuous
U-SPAC-ROOM	Net room area boundaries (poly lines)	4-cyan	continuous
U-SPAC-RMID	Space management control number for room poly lines	5-blue	continuous
U-SPAC-GROS	Gross floor area boundaries (poly lines)	6-magenta	continuous
U-SPAC-FLID	Space management control number for floor poly lines	5-blue	continuous

Layer Name Formatting

Follow AIA CAD Layering Guidelines and use AIA CAD Layering Guideline layer names. No exceptions.

FILE NAME CONVENTIONS

Oklahoma State University requires that each CAD file submitted as a project deliverable contain only one drawing model with one title block. Without counting the file extension, CAD file names must not exceed 8 characters in length.

Naming Construction Documentation Drawings (primary method):

file name = building ID code + floor ID code
format = 4 character + 2 characters

EXAMPLES:

4557_01.dwg = ROOT #04557 + first floor #01
4557-1.dwg = ROOT #04557 + basement #-1

Floor ID Code:

The standard floor identification code follows a two digit numbering system. Floors above or at grade are numbered sequentially in ascending order, starting with 01, 02, 03, etc. Floors that are below grade are numbered in descending order prefaced by a minus sign and excluding the leading zero, starting with -1 (basement), -2, (sub-basement), -3, etc.

file name = building number + floor ID code + discipline code
format = 4 character + 2 characters + 1 character

EXAMPLES:

037_01A.dwg = ROOT #04557 + first floor #01 + architectural code A
037-1F.dwg = ROOT #04557 + basement #-1 + fire protection code F



Naming Construction Drawings:

Architects, Engineers and Contractors shall use the file naming convention shown below, which follows the *Naming Model Files* section of the 1997 American Institute of Architects' *CAD Layer Guidelines* document.

file name = discipline code + drawing type code + drawing number
format = 2 character + 2 characters + 2 characters

EXAMPLE:

S-FP01.dwg = structural code S- + floor plan code FP + first drawing, number 01

Discipline Codes:

A- Architectural	M- Mechanical
C- Civil	P- Plumbing
E- Electrical	Q- Equipment
F- Fire Protection	S- Structural
G- General	T- Telecommunications
H- Hazardous Materials	U- University (Oklahoma State University defined)
I- Interiors	X- Other disciplines
L- Landscape	Z- Contractor / shop drawings

Drawing Type Codes that apply to all disciplines (where *- represents any discipline code):

*-FP Floor Plan	*-EL Elevation
*-SP Site Plan	*-SC Section
*-DP Demolition Plan	*-DT Detail
*-QP Equipment Plan	*-SH Schedule
*-XP Existing Plan	*-3D Isometric/3D
*-DG Diagrams	

Drawing Type Codes (specific to a particular discipline):

Architectural

A-CP Ceiling Plan
A-EP Enlarged Plan
A-NP Finish Plan
A-RP Furniture Plan

Interiors

I-CP Ceiling Plans
I-EP Enlarged Plans
I-RP Furniture Plan
I-NP Finish plan

Civil

C-EP Environmental
C-GP Grading
C-RP Roads/Topographic
C-SV Survey
C-UP Utility

Mechanical

M-CP Control Plan
M-HP HVAC Ductwork Plan
M-PP Piping Plan

Electrical

E-CP Communication
E-GP Grounding
E-LP Lighting Plan

Plumbing

P-PP Plumbing Plan

Structural

E-PP Power Plan
S-FP Framing Plan
S-NP Foundation Plan

Fire Protection

F-VP Evacuation Plan
F-KP Sprinkler Plan

Telecommunications

T-DP Data
T-TP Telephone



Drawing Number:

The drawing number is the number of the drawing as it falls into a sequential set. If there are five architectural floor plans in the set, then the first drawing is A-FP01.dwg and the fifth drawing is AFP05.dwg



POLICY on CAD FILE TRANSLATION

Error-free AutoCAD Drawing Deliverables:

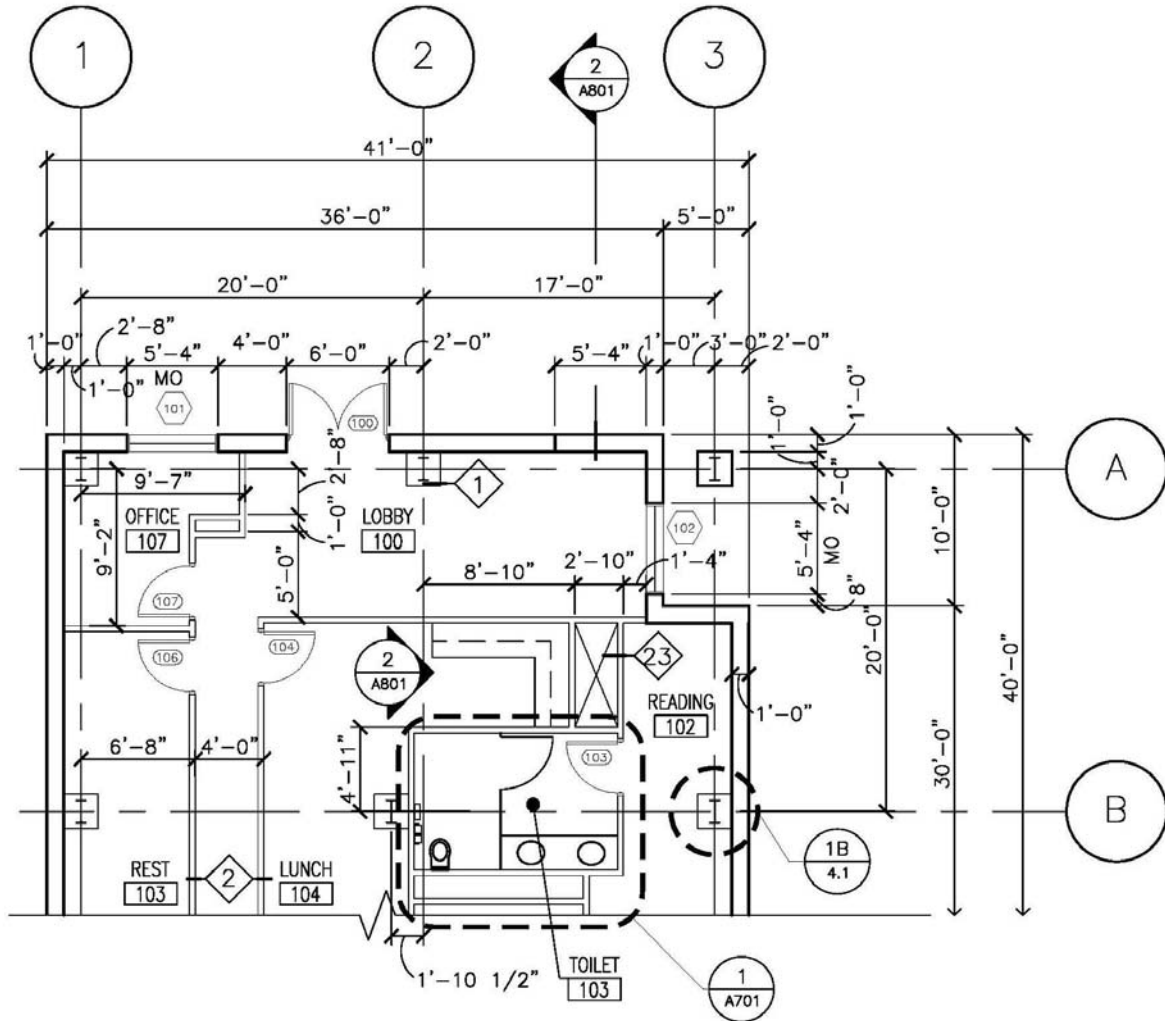
Oklahoma State University recognizes that many of its construction documentation service providers do not use the same CAD systems as the University. However, the University expects that service providers who work with non-AutoCAD file formats will submit DWG formatted CAD files upon project closeout that are fully compliant with all of the standards outlined herein, and which have no loss of drawing entities or project data that can result from standard CAD file translation procedures. All DWG files and CAD drawing entities submitted at the end of a project must be able to be manipulated using standard AutoCAD drafting procedures. Non-compliance with this policy may result in the rejection of CAD files submitted at project closeout in addition to delayed rendering of final project payment. DXF files will not be accepted at project closeout as a substitution for DWG CAD file deliverables.

Translation Testing Recommended:

It is strongly recommended that thorough file translation testing be conducted before the drawing development phase of the project. This will assure early detection of file conversion issues, if any, and allow for corrective measures to be taken before the project closeout period.



DRAWING SAMPLES





GENERAL SYMBOLS AND IDENTIFICATION METHODS

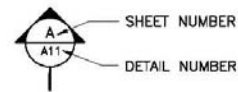
COLUMN GRID DESIGNATORS



DETAIL REFERENCE



ELEVATION AND SECTION REFERENCES



DETAIL NUMBERING



SHEET NUMBERING



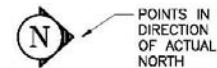
ROOM NUMBERING



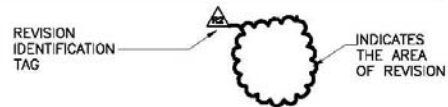
DOOR NUMBERING



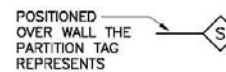
NORTH ARROW



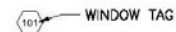
REVISION IDENTIFICATION



PARTITION TYPES



WINDOW IDENTIFICATION



KEYNOTE TAG

