



Computer Aided Drafting (CAD) – Guidelines

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Appendix A Checklist for Electronic Submittal

Appendix B File Description Sheet

OVERVIEW

This computer aided drafting (CAD) guideline is for use on State of Minnesota facilities. These standards have been developed to serve as a guideline for the development of contractually required electronic data submittals to Real Estate and Construction Services (RECS). Consultants shall be responsible for obtaining the most current release prior to the commencement of any work. Please see [RECS Manuals, Forms and Guidelines](#) for the most up to date design guidelines

1.0 GENERAL REQUIREMENTS

Files shall be submitted in **AutoCAD File Format Release 2019 or earlier** in addition to a **PDF** file format. Files can be downloadable from a secure FTP or cloud-based site, emailed, or removable media drive. These files are to be updated during construction to represent as-built conditions. Refer to Appendix A Checklist.

2.0 REQUIRED DOCUMENTATION

The electronic data deliverable package will include the following:

Documentation:

Checklist

Design Drawings

Final As-Built Drawings

Layering Documentation – See Section 5.0

Original RFP

Bid Pack

Initial Contract

Addendums

Supplemental Agreements

All other project documents

Format Required:

Digital Copy

Electronic file

These files should be in **AutoCAD DWG** and **Adobe PDF** format

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2.1 FILE DESCRIPTION SHEET

Each submittal is to be accompanied by a file description sheet. Each sheet is to include the following information:

STATEWIDE PROPERTY ID:	Statewide property identification number for the building in which the project is intended. (Obtained from RECS)
DATE:	The date the data was delivered to RECS for final acceptance.
PROJECT TITLE:	Title of the project.
RECS PROJECT NUMBER:	Project number assigned to project. (Obtained from RECS)
CONSULTANT:	Name of consultant to RECS.
CONSULTANT CONTACT INFO:	Address and telephone number of consultant.
FILE LISTING:	List of files including sheet number and description or Title of files: e.g. Specifications Individual specification sections are not to be listed. Limit file listing on text files to "SPECIFICATIONS"

See Appendix B - Sample Description Sheet

3.0 REQUIRED FILE TYPES

Both text and graphic type files will be included in the electronic data deliverables.

3.1 TEXT FILES

Text files are to be saved in either Microsoft Word (.DOCX) or in PDF format. No other file formats will be acceptable for text files.

3.2 DRAWING FILES

All files are to be submitted in DWG format (**AutoCAD 2019 or earlier**) and a separate PDF file for each sheet in the document set. Any submittal found to have DWG format or PDF format drawings missing will be rejected.

Drawing files that are incorporated via xref are to be included in the submittal. **Submittals found to have missing xref files will be rejected.**

All files are to be delivered via email, secure FTP or cloud-based site, or portable media storage

3.3 PHOTOGRAPHS

All photographic images that are part of the electronic record for the project should be submitted with the drawing package. A separate file location is acceptable but photos must be JPEG, TIFF, PNG or BMP formats

4.0 SUGGESTED GUIDELINES

4.1 FILE NAMING

The following is a guideline for naming sheet files and model files. If your firm has a standard for naming sheets and model files, that standard may be followed. Please submit documentation as to what that naming structure is for reference.

4.1.1 DISCIPLINE CODES

Discipline is the primary method of classification for both file names and layer names. The discipline code provides a path back to the originator of the data. The code also provides a logical categorization of the CAD information.

A	Architectural	L	Landscape
C	Civil	M	Mechanical
E	Electrical	P	Plumbing
F	Fire Protection	Q	Equipment
G	General Information (non-discipline specific)	S	Structure
H	Hazardous Material	T	Telecommunications
I	Interiors	X	Other Disciplines
		Z	Contractor/Shop Drawings

4.1.2 GUIDELINES FOR SHEET FILE NAMES

Sheet File names start with the discipline code, followed by a user-definable numerical field that closely corresponds to the sheet sequence number. For example A-101 for architectural, floor plans, first floor.

Discipline is the primary method of classification for both file names and layer names. The discipline code provides a path back to the originator of the data. The code also provides a logical categorization of the CAD information.

Discipline Codes

A	Architectural
C	Civil
E	Electrical
F	Fire Protection
G	General Information (non-discipline specific)
H	Hazardous Material
I	Interiors
L	Landscape
M	Mechanical
P	Plumbing
Q	Equipment
S	Structure
T	Telecommunications
X	Other Disciplines
Z	Contractor/Shop Drawings

Sheet Type Designators

0	General (symbols, legend, notes)
1	Plans
2	Elevations
3	Sections
4	Large scale plans
5	Details
6	Schedules and Diagrams
7	User Defined
8	User Defined
9	3D views

Sheet Sequence Numbers

Sheet numbers should be designated sequentially starting at “01” and continuing thru “99”

Examples:

The following are sample sheet file names:

A-101.dwg	Architectural, first floor plan, sheet 1.1
A-102.dwg	Architectural, second floor plan, sheet 1.2
A-103.dwg	Architectural, first floor reflected ceiling plan, sheet 1.3
A-201.dwg	Architectural, elevations, sheet 2.1
A-501.dwg	Architectural, details, sheet 5.1

4.1.3 MODEL FILE FORMAT

Model File names start with the discipline code, followed by a two-letter drawing type, followed by a user-definable field. For example, A-FP01 for Architectural, Floor Plan, First Floor.

Discipline Codes

A	Architectural
C	Civil
E	Electrical
F	Fire Protection
G	General Information (non-discipline specific)
H	Hazardous Material
I	Interiors
L	Landscaping
M	Mechanical
P	Plumbing
Q	Equipment
S	Structural
T	Telecommunications
X	Other Disciplines
Z	Contractor/Shop Drawings

Drawing Type codes (all disciplines)

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

Drawing type codes specific to particular Disciplines:

Architectural

A-CP	Ceiling plans
A-EP	Enlarged plans
A-NP	Finish plans
A-RP	Furniture plan

Civil

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

Plumbing

P-PP	Plumbing plan
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Interiors

I-CP	Ceiling plans
I-EP	Enlarged plans
I-RP	Furniture plans
I-NP	Finish plans

Mechanical

M-CP	Control plans
M-HP	HVAC plans
M-PP	Piping plans

Telecommunications

T-DP	Data
T-TP	Telephone

Electrical

E-CP	Communication
E-GP	Grounding
E-LP	Lighting
E-PP	Power

Structural

S-FP	Framing plan
S-NP	Foundation plan

Fire Protection

*-VP	Evacuation plan (may be by other Discipline)
F-KP	Sprinkler plan

4.2 DRAWING FORMATS AND GRAPHICS

Sheet border, title block, consultant's stamp, logos and all other components of the sheet file shall be identified on the drawings.

All graphic representations of the project or facility and all related notes, dimensions, symbols, etc., shall be constructed in model space.

All graphic entities shall be comprised of representational and geometrically accurate entities, e.g. a circle shall be represented by circle entity and NOT a visually equivalent collection of line segments. Items shown in a dashed line type shall be created with the LINE TYPE feature and NOT by individual line elements.

4.2.1 CAD TEXT

All **text sizes** are to plot and display in accordance with the following **minimum** sizes:

Schedules	1/8"
Dimensions and Notes	1/8"
Grid Numbers	3/16"
Sheet Detail Title	3/16"
Sheet Title	1/4"
Sheet Number	3/8"

4.2.2 SPECIAL ENTITY REQUIREMENTS

Common symbols, doors, water closets, windows, equipment, etc., shall be blocks.

Entities to be shown as blocks:

- All plumbing & bath fixtures (e.g., water closets, urinals, lavatories, tubs, grab bars, accessories, mirrors)
- All electrical devices & hardware (e.g., lighting fixtures, switches, outlets, panels)
- Mechanical equipment (e.g., supply diffusers, return grilles, thermostats, air handlers)
- Doors
- Windows
- Equipment
- Furniture
- Drawing Symbols
- Door and window marks, room # indicators, scale indicators, north arrows

4.3 DIMENSIONING

All dimensions shown in the project submittals shall be fully associative. Dimension definition points should be located with an appropriate Object Snap (End Point, Mid-Point, etc.) or otherwise located precisely on the project geometry. Manual input of dimension text or otherwise over riding the actual dimensions is NOT acceptable in submittals to RECS.

4.4 LINE WEIGHTS AND PEN ASSIGNMENTS

These pen/color assignments are provided to help RECS personnel in producing consistent hard copy output from the electronic submittals.

4.4.1 RECS PEN/COLOR ASSIGNMENTS

AutoCAD Number/Color	Pen Size (mm)	Line type
1 Red	.25	Dark Screen
2 Yellow	.25	Solid
3 Green	.35	Solid
4 Cyan	.25	Solid
5 Blue	.50	Solid
6 Magenta	.25	Solid
7 White	.18	Solid
8 Dark Grey	.13	Solid
9 Color Varies	.25	Medium Screen
10 Color Varies	.70	Solid
11 Color Varies	1.00	Solid
12 Color Varies	1.40	Solid
13 Color Varies	2.00	Solid
14 Color Varies	.35	Solid
15 Color Varies	.25	Light Screen

5.0 LAYERING

RECS recommends following the AIA layering system. If your firm uses another layering system, please provide documentation as to describe that system with your submittal.

Regardless of the layering convention employed, all building elements—including exterior and interior walls, columns, doors, and glazing—as well as annotation objects such as text, must be assigned to dedicated layers to facilitate efficient model component isolation and view control.

Checklist for CAD Record Drawing Submittals

Electronic submittal items

- ☐ Drawings - including all x-referenced files in .dwg file format (Section 1.0)
- ☐ Specifications (Section 1.0)
- ☐ PDF files of letter size prints of all as-built drawings (Section 2.0)
- ☐ CBT file for pen style reference (Section 4.4)
- ☐ File Description Sheet (Section 2.2)
- ☐ Layering Documentation (Section 5.0)
- ☐ Original RFP (Section 2.0)
- ☐ Bid Pack (Section 2.0)
- ☐ Initial Contract (Section 2.0)
- ☐ Addendums (Section 2.0)
- ☐ Supplemental Agreements (Section 2.0)
- ☐ All other project documents (Section 2.0)

Submit electronic record drawings and specifications as follows:

- ☐ 1 copy to State's Project Manager
- ☐ 1 copy to user facility\agency

Additions (additional items that are included in submittal)

- ☐ _____
- ☐ _____
- ☐ _____

Exceptions:

- ☐ _____
- ☐ _____
- ☐ _____

I certify that all items are including in this record drawing submittal except as noted:

Consultant Signature / Title

Date

Real Estate and Construction Services ELECTRONIC SUBMITTALS - FILE DESCRIPTION		
Date:		
RECS Project Number:		
Project Name:		
Agency:		
Facility:		
Building:		
Statewide ID:		
Prepared By:		
CAD File Index		
Sheet File	Sheet Number	Sheet Description