UNIVERSITY *of* ALASKA ANCHORAGE

Facilities Planning and Construction

CAD STANDARDS

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CAD Standards

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PART 1: Working With the CAD Standards

The first part of this manual describes how to conform to these standards: the purpose and scope of the standards, receipt and delivery of data, and communication. The second part of the manual describes the University's technical requirements for CAD data.

Section 1. Purpose and scope of the CAD data standards

Computer-Aided Design (CAD) is an accepted tool for producing the documentation required for construction and management of facilities; it also provides for a common medium of information exchange. In fact, the true power and potential of CAD is the ability to re-use and share the information contained within the CAD document. The key to realizing this potential is common organizing principles and standards for the production and dissemination of CAD information. The standard organization of files, layers and entities, as well as standardized software applications is essential for effective work and communication. Standards are necessary to ensure that:

■　　CAD drawings and data created in one phase (e.g., design) are readily usable in subsequent phases (e.g., facility management, space management).

■　　Drawings and data are applicable for their intended use.

■　　Drawings and data are compatible with the available CAD equipment and software.

■　　Drawings and data created for one project or project discipline, are compatible with those created for others.

■　　Drawings and data can be transferred and integrated with other applications, such as facility management and space management.

■　　Drawings and data created in one department of the University are consistent with those developed by the other departments.

■　　The compatibility of the University CAD drawings and data with pertinent national, international and industry standards is maintained.

Because CAD guidelines relate to an area of technology that continues to change, it is important that they evolve and improve. To ensure that the University of Alaska Anchorage and its consultants conform to the broader scope of the proposed National CADD Standard, sponsored by the National Institute of Building Sciences (NIBS) CADD Council, these Standards partially incorporate recommended guidelines from the following:

■　　　　American Institute of Architects (AIA), CAD Layer Guidelines

■　　　　The Construction Specifications Institute (CSI), Uniform Drawing System (UDS)

■　　　　The Tri-Service CADD/GIS Technology Center, symbols and deliverables

■　　　　GSA PBS National CAD/CIFM Standards

1.1 Why the University has data standards

This CAD data standards manual is part of the University's comprehensive facilities and space management strategies. Much of the CAD data created for the University of Alaska Anchorage will be brought into the University's Information Management System, and this data must follow these CAD data standards to be readily useful within that system.

This document sets performance standards for CAD data delivered to the University. The University does not intend to influence the methods or means of practice of outside consultants.

The University is committed, however, to enforcing the standards of information delivery that insure predictability and the ability to easily reuse information. As a result, these standards will be included as part of the contractual requirements for delivery of electronic information to the University of Alaska Anchorage Division of Facilities Planning and Construction.

1.2 Scope of the CAD data standards

This data specification covers all construction documents prepared by or on behalf of the University of Alaska Anchorage. The deliverables described in this manual must be provided for each sheet that is issued for construction in a project and must include all supporting data files that are used to produce the finished sheets.

If additional electronic design drawings or 3-D models are provided, it is the responsibility of the consultant to initiate discussion with the University Owner's Representative to determine an acceptable format for those deliverables.

1.3 Who must use the standards?

Anyone who is going to prepare CAD data for the University, including University Facilities Planning and Construction staff, contractors, and consultants, must read and become familiar with this document before proceeding with any work. (The term "consultant" used in this manual refers to the person or organization who is preparing the CAD data, whether the person or organization is part of the University or not.)

Section 2. CAD Environment

2.1 Basic CAD Software

The designated CAD software for the University is Autodesk's AutoCAD. All CAD drawings are required to be delivered in AutoCAD's .dwg file format.

2.2 CAD Application Software

CAD application software packages operate on top of, or in conjunction with, the basic CAD software to extend its capabilities. The extensions enhance design, drafting and modeling productivity and link non-graphic attribute data to the graphic entities. All CAD application packages used by Facilities Planning and Construction, or its consultants, which modify or create CAD layers or other entities must comply with these standards.

Section 3. Requesting CAD Data from the University

Consultants may request copies of existing CAD data for University facilities. CAD data is provided for the convenience of the recipient only. This data has been gathered from a variety of sources, and it may or may not conform to University CAD standards. The data may be incomplete, or may not accurately reflect current facility conditions.

The University makes no representation as to the data's completeness or accuracy. Consultants also should acknowledge that CAD data appears to be extremely accurate because it has been generated with a computer, and that the accurate appearance of drawings does not guarantee that they truly represent existing conditions.

CAD data submitted by consultants to the University must be accurate and must conform to the current CAD standards, even if reference data provided by the University was inaccurate or did not conform to the standards.

3.1 How to request data

Requests should be made to the University's owner representative. The owner representative will review the request and forward it to CAD/GIS Operations Manager, who will have the requested files copied and sent to the owner representative.

Section 4. Deliverables required by the University

At the conclusion of a project, there are three types of materials that consultants must submit to the University, as follows:

CAD drawings

Documentation

Software and software licenses, if applicable

Each of these submittals is explained in more detail below.

4.1 CAD drawings

Consultants will deliver to the University a complete set of the project's CAD documents in electronic form. These documents must include all supporting CAD files and must be delivered as follows:

- In a format supported by the current AutoCAD version in use within Facilities Planning and Construction. As of January 1, 2010, AutoCAD 2010 is the current version in use. Verify the current release with the Owner's Representative.

- On acceptable media, currently defined as CD-Rom or DVD Disks.

- Reflecting "as built" conditions

- Using the data structure defined in this manual.

Neutral File Format

CAD graphic files copied to neutral file exchange formats such as drawing exchange format (.dxf) and initial graphics exchange specification (.iges) can be read by numerous basic CAD packages. However, none of the neutral file exchange formats currently available have reliable mechanisms to transfer the wide variety of non-graphic linkage mechanisms used in both basic CAD and advanced CAD application software packages. Therefore, neutral drawing exchange formats are not acceptable.

AutoCAD 2007 or current version file format

All files must be delivered in native .DWG file format in a version that can be used by the currently supported version of AutoCAD within FP&C without conversion. DXF format files are not acceptable. Verify the current release with Facilities Planning and Construction.

Acceptable media for delivery of CAD data

Digital data sets shall be furnished via compact disc-read only memory (CD-ROM) or Digital Video Disc (DVD). Files shall be delivered in uncompressed format.

Digital media labels should contain the following information as a minimum:

- University project name and number

- Building name and number

- Short description of media content, ie: As-Builts, Conformed, Bid Documents, Shop Drawings, etc

- Consultant name and telephone number

- Date of submittal

- Virus scanned (date and software used)

- Both the CD-ROM case and the CD-ROM itself shall be labeled.

All digital media, which contains files for entry into the University drawing library, must be scanned for viruses. This includes all files received from sources within and outside the University.

Reflecting "as built" conditions

The University needs CAD data that reflects the actual condition of its facilities. CAD drawings submitted by consultants must show "as built" conditions of any facilities affected by a project.

"As built" drawings include design and detail changes that may have taken place after the initial issue of construction documents, as well as changes made to the actual facility during

construction.

Conformance to CAD data standards

The CAD data delivered to the University by consultants must comply with the University CAD Standards that are in effect during the current project.

The current project's CAD drawings may contain information that has been extracted from existing University CAD drawings, which may not conform to the current CAD standards. The consultant must make sure that all CAD data delivered with a project conforms to the current CAD data standard, even if the source drawings did not conform.

The consultant will be required to update any non-conforming CAD drawings that are used to produce the current project's drawings.

4.2 Documentation

The delivered CAD drawing files must be accompanied by the documentation described below. This information must cover all CAD files delivered to the University.

■   A list of any extended discipline codes, non-standard drawing type codes, and user defined codes that are used in the CAD file names.

■   A list of approved exceptions to the standard layer structure (a single exception list is acceptable if all files conform to the list).

■   A list of any deviations from the standards, with reference to the written approval obtained for those deviations that required prior approval.

■   A description of any third party products that have been used with the drawings and reference to written approval for their use. (See also CAD Application Software in the CAD Environment section.). This is necessary if the CAD application software:

        affects the University's ability to review or edit the drawings

        requires the University to own a license to the software to work with the CAD files without violating the software's copyrights.

4.3 Software and software licenses

The University strongly prefers that the delivered CAD files be usable without any additional software licenses or installation. If additional software (font files, menus, symbol libraries, etc.) will be required, it must be approved by the Owner's Representative prior to its use.

If the CAD files cannot be viewed or edited without additional licensed software, the consultant must provide the University with valid licenses for that software on acceptable delivery media.

4.4 Submittal schedule

The final submittal of "as built" CAD data should be made after project construction is complete and facilities have been occupied.

In addition, the University may require sample submittals at key milestones in the development of the CAD drawings, specifications and data in accordance with the contract.

Sample submittals are not intended to be a burden on the consultant, and typically will involve a very limited number of drawings. It is recommended that digital media submittals, as a minimum, be provided at the first and final submittal milestones. Providing digital media at the first submittal milestone will allow the University to verify that the data structures being used by the consultant conform to the CAD data standards and are readily usable with the University CAD systems.

4.5 Validation of delivered materials

The University of Alaska Anchorage FP&C Department will validate the CAD data and other materials submitted by consultants. If submittals do not conform to the CAD data standards, the University may return the materials to the consultant, for corrections.

The consultant is responsible for revising the materials to make them conform to the standards.

Section 5. Communication about the CAD Standards

These Cad Standards will be most effective for the University and most usable for consultants if there is communication between consultants and the University's Representative.

Consultants should ask questions about the CAD data standards before beginning work. Direct questions to the FP&C CAD/GIS Operations Manager, University of Alaska Anchorage. Concerns regarding the impact of the CAD standards on a particular project must be discussed with the Owner's Representative.

Consultants questions are valuable because they help the University understand the real-world conditions of each project's design and construction process. Questions will raise issues that will result in better CAD standards.

5.1 Suggestions for the standards

The content of the manual is intended to be neither static nor all-inclusive and thus will be updated and enhanced as appropriate. Suggestions for improvements are encouraged so that subsequent updates reflect the needs of the University. Submit suggestions, as well as any pertinent new information which would enhance these standards, to the FP&C CAD/GIS Operations Manager.

PART 2: Technical Requirements for CAD Data

The organization and format of the CAD deliverables should support the requirements of the University project for design, construction, bidding and archiving. The deliverable should also readily support the integration of information into other University management systems, such as facility maintenance management systems, with minimal additional effort.

The University's standards for CAD file types, file names, and sheet numbering are based on industry standards. The requirements of these standards are described below.

Section 6. Types of CAD files

The University's CAD data will include two distinct types of CAD files, model files and sheet files.

Model files contain the project's data, and sheet files are the vehicles used to present the data in different ways.

6.1 Model files

A model file contains the graphics, which describes a subset of a building's geometry and its physical components: walls, doors, windows, columns, beams, outlets, ducts, etc. This information can be thought of as a computer "model" of the facilities involved in a project.

A model must be created at real size: 1=1. Most buildings are described by a series of two-dimensional models: plans, elevations, sections, and details.

Model files are usually referenced by other files. Models can contain other models referenced in those files.

6.2 Sheet files

Sheet files are used to assemble model files, title blocks, and other information for plotting. A sheet file contains one or more scaled views of one or more models arranged within a border and title block.

A sheet file is a 'ready-to-plot' CAD file. Each sheet file contains the parameters that will produce its corresponding plotted drawing, such as scale, layer visibility, and graphic appearance.
Sheet files contain AutoCAD's paper space information. They are never referenced by other files.

By organizing information into model and sheet files, plans and other drawings can be developed without concern for layout of the construction document. Sheet files can also be developed later on in the project cycle. Sheet files allow for consistent plotting standards while also allowing different types of plots from the same CAD model.

Multiple sheets can be created using the same model, where each sheet contains a different graphic representation of the model using different plotting parameters. For example, an architectural floor plan and an electrical power plan can be set up simultaneously using the same model file. In this simplified example, there would be four files: two model files and two sheet files.

6.3 Managing data for enlarged plans

Enlarged views (plans, sections) of a portion of the building typically include information that is not shown in the model file for a full floor plan. The additional information may include building components as well as dimensions and annotations. A similar situation may occur when creating alternative design options for the same location in a facility. This standard provides two methods for managing information that is included in enlarged plans or alternate views.

Method 1: Additional layers in the model file

Additional model data and dimension text is added on special layers to the existing model file. These layers will hold text and more details about the model that appear on enlarged plans. The additional data layers can be turned on when the information should appear in a plotted sheet. Text and dimensions should be appropriately sized for the scale of the plotted sheet.

The additional layers must not contain duplications of data that exists in other layers. Layers should be referenced, even by other layers, so that duplicate data is not drawn and does not have to be maintained.

A method for naming these additional layers is described in the section of this manual that covers layers.

Method 2: Separate model files

A separate model file may be created to hold additional model data that appears on some plotted sheets. This model file will hold text and more details about the model that appear on enlarged plans. Only the additional data needed for the enlarged plan should be included in this model.

This model file should be referenced by the sheet file when this additional information is needed.

The additional model files must not contain duplications of data that exists in other model files. Model files should be referenced, even by other model files, so that duplicate data is not drawn and does not have to be maintained.

Either of these methods is acceptable to the University. Generally, it is easier to maintain model data that has been created in multiple model files. It may be easier to work with the data during the design and construction documentation process, however, if there are fewer model files but more layers.

Section 7. CAD file names

The sheet identification format has its roots in traditional construction drawing techniques. CAD files must be named following the "8.3" (eight character file name followed by a three character extension) short file naming convention, where each file name has a maximum of eight characters, a dot, and a three-character extension.

The eight-character file names must follow the naming rules described in this section of the manual. Rules are described for sheet files.

The three-character extension for CAD drawing files must be DWG. The following naming convention is required for sheet file name.

7.1 Sheet file names

The use of systems methods, overlay drafting, and now CAD has demanded more consistency in labeling and organizing sheets. Sheet file names must be constructed in the format in Table 1.

Sheet Number			
UAA Project Number Acronym	Discipline Code	Sheet Sequence Number/User Definable Code	Extension
ABCD-	**A**	**01**	**.DWG**

Table 1: Sheet file name example

UAA Project Number Acronym

The first four or five characters reflect the specific acronym given to every University project. The hyphen is a required placeholder in the absence of a fifth character.

Discipline code

The sixth character shows the letter that must be used for the first character of the discipline code shown in Table 2.

Code	Discipline
A	Architectural
C	Civil Engineering
E	Electrical Engineering
F	Fire Protection
G	General
H	Hazardous Materials
I	Interior Design
L	Landscape Architecture
M	Mechanical Engineering

P	Plumbing
S	Structural Engineering
T	Telecommunications
X	Other disciplines
Z	Contractor/shop drawings

Table 2: CAD file discipline codes example

Sheet sequence number

The seventh and eighth characters of a sheet number contain the sheet sequence number, which is a two-digit number that starts at 01 and may ascend through 99. The sheet sequence number identifies each sheet in a series of the same discipline and sheet type. As many numbers may be used as are needed for each discipline/sheet type combination.

Sheet numbers must use two digits, even if a project does not require that many sheets. The use of two digits allows sheet file name to be consistent regardless of project size.

Every drawing sheet in a project must be assigned a unique identifying number that appears on the plotted output. There is a one-to-one correspondence between sheet files and plotted sheets in a project.

All sheet types may apply to all disciplines, but it is not necessary to use all sheet types within a project or within a discipline.

Consultants may combine different types of drawings on the same sheet, for simplicity. For instance, it is acceptable to place schedules on a plan sheet where the information is closely associated.
On some projects, the presence of split-levels, mezzanines or interstitial spaces may make it difficult to use floor numbers as sheet sequence numbers. Consultants should evaluate the needs of a project when developing the project's sheet sequence numbering scheme.

Many times sheets are added to a project's set of drawings after sheet sequence numbers has been assigned and is in use. These additional drawings may be inserted in the set by using suffixes, which can be in addition to the two user definable characters of the sheet number. The user definable characters are described below.

 User definable code

The University recommends that consultants follow the CSI's method of using these characters to indicate when a sheet has been reissued with revised information.

The examples in Table 3 show possible uses for these two characters.

Sheet Number	Description
A-01R1	Floor plan sheet A-01, reissued after partial revision
A-01X1	Floor plan sheet A-102, reissued after total revision
A-01A	Floor plan sheet for unit A of floor 01 when a facility is large enough that the entire floor plan will not fit on one sheet.
A-01A1	Floor plan sheet A-01A1 for phase 1 of a sequenced construction

Table 3: User definable codes

Consultants may determine the user definable codes that make sense for a project. A list of user definable codes and their meanings must be submitted to the University.

Extension

The University requires that all sheet files be named with the sheet number that appears on the plot, plus the AutoCAD file name extension .DWG.

Section 8. Layers

The University has adopted in part the CAD layer naming system published by the AIA in its 1997 CAD Layer Guidelines. Consultants should follow that layer naming system when additional layer names are required in a project's CAD drawings that are not addressed in the UAA CAD Layering Standard.

Layer names and assignments are shown in Appendix A: UAA CAD Layer Standards. The layer table categorizes layers by discipline and by type of CAD file. This table also shows several items for each layer, as follows:

- ■   A complete listing of all layer names

- ■   A detailed definition for each layer

- ■   The presentation graphics associated with each layer. Some colors and line types are listed as a preference of the University but not a requirement.

Consultants who wish to use additional layers must submit a list of proposed layer names and their meanings to the University.

8.1 Layer Format

The University's layer guidelines are organized as a hierarchy. The convention utilizes a scheme of naming layers with four field groups. The four groups are discipline code, major group, minor group and status field.

Layer name with discipline, major group, minor group and status field
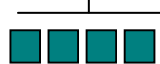
Discipline Code   *Major Group*   *Minor Group*   *Status Field*
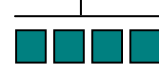
Discipline Code

The Discipline Code is a one-character field. The defined codes are the same for both layers and file names. Table 2 shows the letters that must be used for the first character of the discipline code.

Major Group

Major groups are a four-character field used to identify the building system. Major groups are typically grouped with specific discipline codes. For example, a drawing might contain the following layers:

> A-WALL   Walls
> A-DOOR   Doors
> C-PKNG   Parking Lots

Minor Group

Minor groups add an additional set of information to the layer names. It is an optional, four-character field that further differentiates major groups into types of information. For example, A-WALL-PART indicates architecture, new, wall, and partial height.

User-Definable Fields

The minor group field can be defined by the user, allowing additional layers to be added to accommodate special project requirements. This should only be done if a defined layer does not apply to a project. Some examples of layers using a user-defined minor group field are as follows:

> A-DOOR-PRHT Partial height doors
>
> A-WALL-EXT   Exterior walls
>
> M-EXHS-DUCT Exhaust system ductwork
>
> E-LITE-EMER   Emergency light fixtures

Layer lists are provided in Appendix A.

8.2 Common Layers Used in All Files

Annotation Layers

Annotation comprises of text, dimensions, sheet borders, detail references, and other elements on CAD drawings that do not represent physical aspects of a building. The major group "ANNO" designates annotation. Types of annotation are designated in Table 4 as follows:

Layer Name	Layer Description
*-ANNO-DIMS	Extension lines, dimension arrowheads/dots/slashes, dimension text
*-ANNO-KEYN	Keynotes with associated leader lines and arrowheads, ConDoc keynotes
*-ANNO-LEGN	Legends and schedules
*-ANNO-NOTE	General notes and general remarks
*-ANNO-NPLT	Construction lines, reference targets, area calculations, review comments, viewport windows
*-ANNO-PATT	Miscellaneous patterning, cross-hatching, poche'
*-ANNO-REDL	Redline
*-ANNO-REVS	Revisions
*-ANNO-SYMB	Miscellaneous symbols
*-ANNO-TEXT	Miscellaneous text and callouts with associated leader lines and arrowheads
*-ANNO-TTLB	Border and title block
*ANNO-XREF	Reference files

Table 4: Annotation Layers.
* asterisk represents discipline code

Annotation can be placed in both model files and in sheet files. Dimensions, symbols, and keynotes would typically be placed in model files. Borders and title blocks would typically be placed in sheet files. The same layer names would be used in both cases.

A special case exists when a single model file is referenced by two or more sheet files. In this case, it may be necessary to differentiate two or more "sets" of annotation. Consultants should name these layers by adding a hyphen and four characters to the end of any standard major group. For example, a model file containing both floor plan and ceiling plan information may need different layers for ceiling plan dimensions and floor plan dimensions. In this case, users should modify the minor group to indicate the intended view. For example, A-ANNO-DMFP for floor plan dimensions and A-ANNO-DMCP for ceiling plan dimensions. These new layers and the information they contain must be documented and submitted to the University.

Status Layers

The status field is an optional, four-character field that designates the phase of construction and status of the elements. This field is optional and is only needed when phases of work need to be differentiated. Table 5 shows the defined values for this field:

Layer Name	Layer Description
*-****-N	New Work
*-****-E	Existing to Remain
*-****-D	Existing to Demolish
*-****-F	Future Work
*-****-T	Temporary Work
*-****-M	Items to be Moved
*-****-R	Relocated Items
*-****-NIC	Not in Contract
*-****-PHS1-9	Phase Numbers
*-****-A	Abandoned

Table 5: Status Layers
*asterisk represents discipline code and major group

Layers representing the dominant phase can be represented without a status field. For example, in a small remodeling project, N would indicate new construction and layers without status fields would indicate existing to remain. Special groups of layers for a particular model file will have status layers (*-****-N).

The status field is always placed as the last field of the layer name. In a simple layer name such as A-WALL, the status field would be the third field, A-WALL-D. In a more detailed layer name, the status field would be the fourth field, A-WALL-FULL-D.

Section 9. Drawing Set Up

This section describes how to organize and set up CAD drawings for the University. It has been prepared using the AIA CAD Layer Guidelines and the CSI Uniform Drawing System. It is recommended that University employees and consultants obtain copies of these materials to supplement this section.

Consultants must obtain prior approval from the Owner's Representative for any exceptions to the drawing set up standards. Consultants must submit documentation that shows the files affected and how they deviate from the standards.

9.1 Drawing units

Most CAD files should use the architectural (feet and inches) report format. Civil engineering CAD files may use the engineering (feet and tenths) report format.

9.2 Accuracy

All CAD drawings shall be drafted using precision input employing the most accurate source material available. For all drawing entities, zero tolerance is required, all lines meet at intersections, straight lines are straight, blocks are inserted properly without overlap, etc.

Consultants are responsible for the accuracy of all CAD drawings delivered to the University, regardless of the accuracy of CAD drawings of previous projects furnished by the University as a convenience to the consultant.

9.3 Scale

Objects shall be created at full size--a 100-foot wall will be drawn to 100 feet and a 36-inch column will be drawn to 36 inches. The following types of CAD drawings may be drawn to any scale: schedules, riser diagrams, schematic diagrams and single line diagrams.

9.4 Origins and registration of CAD data files

The origins of CAD model files must be defined at coordinates 0, 0, 0, with the exception of Civil Engineering CAD model files. This is typically the lower left corner of the building. For non-rectilinear buildings a logical origin point shall be established.

The origin point must remain consistent between all model files in a project. This is critical for correct registration of different model files when referenced together, aligning the various views of the facility. Registration of electronic data must be maintained so the information will be usable in future applications.

The origin of each CAD sheet file should be at the lower left-hand corner of the sheet border and set to coordinates 0, 0, 0.

Special considerations for site plans

Civil Engineering CAD model files must use true geographic coordinates for their origins. The basis of coordinates used shall be clearly identified within the model space and listed in the notes of the printed sheets.

9.5 Entities and graphic representation

Curved Entities

Circles, arcs and ellipses shall be created as individual entities, not of line segments.

Drawing Limits

Drawing and extents must be checked to ensure there are no objects outside the drawing limits. Objects outside the drawing limits will slow the regeneration and manipulation of the drawing. All drawings shall be submitted with the drawing display zoomed to the drawing extents.

Entity Properties

Entity properties such as color and linetype shall be BYLAYER. For purposes of clarity, some symbol and block properties may not be set BYLAYER, but this should be avoided whenever possible.

9.6 Saved state of CAD model files

CAD files should be delivered in the state described below.

■   Blocks should not be exploded.

■   Drawings should be purged.

■   Drawings should be zoomed to extents.

■   Drawings should be left in paperspace if they use paperspace

■   The menu should be set to ACAD.

9.7 Sheet sizes, borders, and title blocks

Sheet sizes, borders, and title blocks used for University projects will comply with the Uniform Drawing System (UDS), 1997, drawing sheet standards developed by the Constructions Specifications Institute.

Select American National Standards Institute (ANSI) architectural sheet, regular architectural sheet size or Metric sheet size to best fit the project size and complexity, and unit of measurement (Metric or English). Consider also plotter limitations and handling/storage of hard copies.

Determine if the selected sheet size has been specified by the Owner's Representative before starting the project.

9.8 Plotting

Each sheet drawing file generally represents a single plotted drawing. The sheet origin point is the lower left-hand corner of the sheet. The sheet border may be an xref file inserted at 0,0. No drawing entities should reside outside of the sheet's border. When saving a sheet file, make only the layers needed for correct plotting of the sheet visible. Plotting shall be set at a scale of 1"=1".

9.9 Sheet identification/numbering

Sheet sequence identifier numbers start at 01 and continue through to 99. Sheet numbering systems vary and shall be approved before beginning the drawing set. The CSI UDS guidelines shall be used unless an exception is approved by the Owner's Representative (see also the section on Sheet file names).

9.10 Title blocks/borders

Title blocks and borders shall follow CSI Uniform Drawing System (UDS) guidelines unless an exemption is approved by the Owner's Representative. A sample title block layout and schematic sheet setup follows. Refer to the UDS for additional guidance.

Title Block Area
Based on CSI Uniform Drawing System

Key plan block if used. (Or, key plan may be placed in lowest module of note block.)	KEY BLOCK PLAN (IF USED)
Identifies designer or preparer of sheet. Include: Name Address Telephone/Fax Number E-mail/Internet Block may also include preparer's logo, professional seals, certifications and the name and addresses of consultants	DESIGNER INFORMATION BLOCK
Identifies the project. Includes: Project name, number and address Building/Facility name and number Construction phase sequence Owner/Client address, telephone/fax numbers and logo may also be included.	PROJECT IDENTIFICATION BLOCK
Shows the issue and revision dates. Include mark, date and description columns.	ISSUE BLOCK
Project management information such as project number, drawn/checked by, copyright.	MANAGEMENT BLOCK
Indicates type of information presented on sheet.	SHEET TITLE BLOCK
Sheet number Sheet sequence number	SHEET IDENTIFICATION BLOCK

Sample Title Block Layout

OVERALL SHEET LAYOUT SCHEMATIC
BASED ON CSI UNIFORM/ DRAWING SYSTEM

A   B   C

KEY PLAN
 BLOCK

DESIGNER
IDENTIFICATION
 BLOCK

PROJECT
IDENTIFICATION
BLOCK

ISSUE BLOCK

MANAGEMENT BLOCK

SHEET TITLE BLOCK

SHEET IDENTIFICATION BLOCK
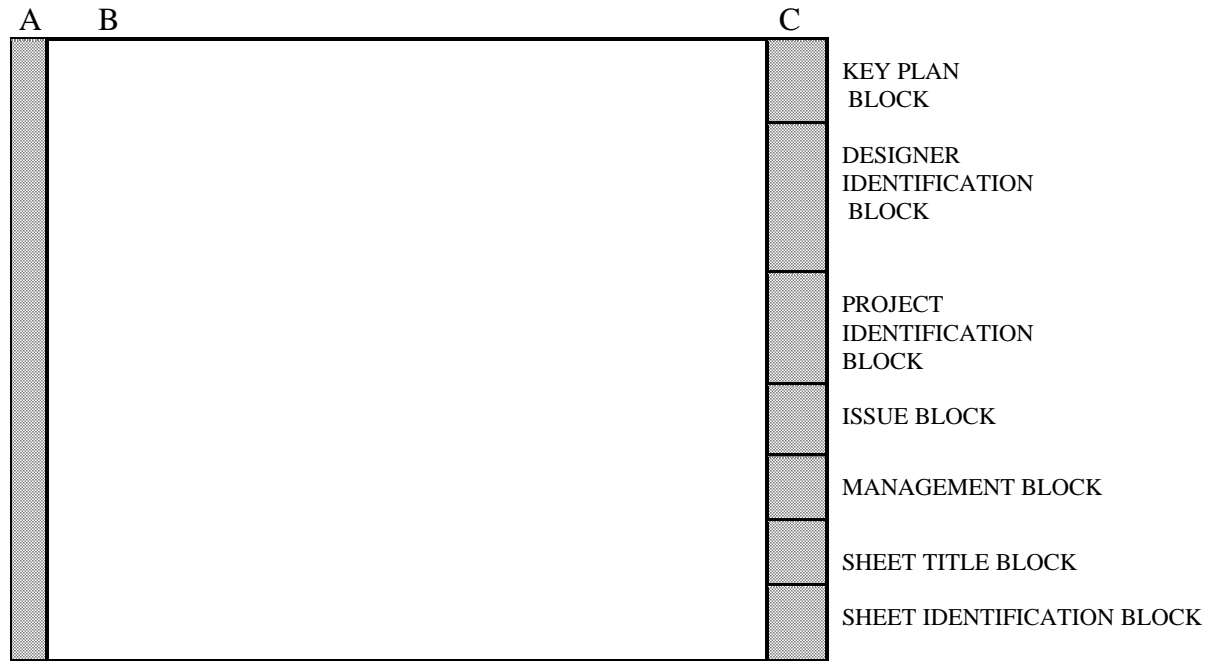
A   PRODUCTION DATA/BINDER AREA (OPTIONAL)
B   DRAWING AREA
C   TITLE BLOCK AREA   *Schematic Sheet Setup*

9.11 As-Built and Conformed Designation

Each sheet of conformed electronic files must be noted as "Conformed Revisions" and dated in the issue block of the title block along with a 3"w x 2" h block that states "Conformed Set" and date as follows:

CONFORMED SET
00/00/00
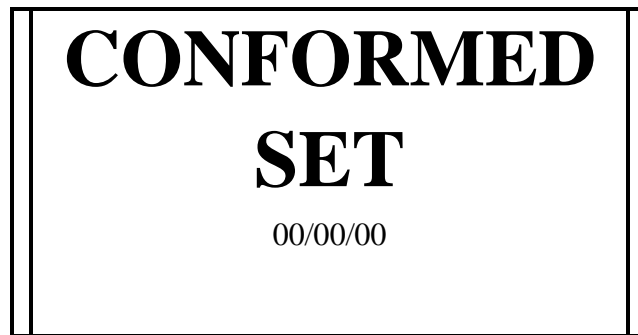
Stamp must be located   in the lower right corner of the drawing area to the left of the title block above a blank space 3"w x 2"h left blank for the successive As-Built stamp block   As-Built stamp is to be 3"w x 2"h that states "AS-BUILT" on top line followed by three lines for the company name, date and signature of authorized representative as follows:

AS-BUILT

Company

Date

Signed

Section 10. Symbology and Composition

10.1 Line types

Use standard line types whenever possible. Contour lines, dashed lines and other fonted lines shall be made of one continuous line segment, not a series of separate line segments. If the consultant is using pre-approved basic CAD software other than AutoCAD, insure that line types translate correctly in the .dwg file.

Polylines with increased width may be used only to depict non-building drawing elements such as cut-lines. Use of toned or pochéd line weights for use with inkjet or electrostatic plotters to differentiate new or existing work is acceptable.

Line types that are not AutoCAD defaults must be provided to the University including any software, software licenses, and documentation needed for University staff to use the CAD data without violation of software copyrights.

10.2 Line type scale

Line type scale must be set so that each line type is recognizable, easily identified, and distinguishable to individuals who are working in the model files and in final plotted output.

10.3 Line weight and color

Consultants may use additional line weights as needed for effective communication of the project data.

Line weight and color affect the usability of CAD data in different ways. Line weight typically is most useful when working with plotted CAD drawings. Plots, or reproductions of plots, are usually monochrome and the thickness of lines is an important means of communicating information about the facility and the design.

Color is most useful when working with CAD data on a computer screen. Colors allow users to readily identify systems and types of information. On a computer screen, line weight often gets in the way of effective communication.

10.4 Text and Fonts

All text on University CAD drawings shall use only standard text fonts supplied with
AutoCAD's font library. CAD files submitted shall be plot-able without modification and with
no additional software required.

Text size must be legible and appropriate for the graphic information presented and the intended
plotted scale of the drawing. Text must be in all upper case letters throughout a drawing, except
for electrical switch legs and symbols, which require lower case letters.

Text placement guidelines

Text usually should not touch other graphic objects, and must be placed with enough space
around it to be legible when the drawing is plotted and reproduced.

Text may be placed at an angle. It must be readable from the bottom or right edges of the plotted
sheet. Generally text should be placed at an angle of 0° or 90°. Text may be placed along (above
or below) another element at an angle other than 0° or 90°.

Units

English (Architectural in AutoCAD) units shall be the standard system of measurement. The
base unit shall be inches.

10.5 Annotation

Annotation can be placed in either model files or sheet files. Annotations related to model data,
such as dimensions, notes, and callouts must be included in the model file where they are easier
to coordinate and revise.

Other annotations, such as drawing titles, legends, and sheet-specific notes, are more convenient
to work with when placed in the sheet file.

10.6 Dimensions

The default settings for AutoCAD's dimvars should be used. Associative dimensions should be
used.

Consultants should insure that all dimensions are in a named dimension style for all dimensions
in CAD files, so the dimension parameters can be readily modified as needed.

10.7 Xref (External Reference) Files

Xrefs may be used to subdivide a large CAD drawing into several smaller, more efficient
drawings. The use of this procedure will reduce drawing size, increase performance, improve
operator efficiency and make coordination of disciplines easier. Xrefs may also be used to split a
drawing by disciplines. When possible, avoid nested xrefs. There shall be no specific drive or
directory references associated with the xrefs. All xrefs must reside in the same directory as the

drawing files.

Consultants must provide all xrefs to the FPC Owner's Representative by either separate model files or by "binding" the xref (model) files to the sheet file.

10.8 Blocks

Any graphic entity that occurs repeatedly in drawings should be made into a block. Insertion points for blocks shall be consistent with its placement in the drawing. Use a logical insertion point (center of circle, bottom left corner of object, etc.). Keep names simple and descriptive. AutoCAD block names must be unique within each project.

Nested blocks contain more than one block definition. Nested blocks are permitted but should be avoided whenever possible.

10.9 Hatching

Do not use polylines with increased width as a replacement for poché or hatching. Use pattern hatching sparingly since the practice significantly increases the AutoCAD entity count of a drawing (if using versions prior to AutoCAD Release 14).

Section 11. Reference: Organizational Addresses

CAD Layer Guidelines
American Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006-5292
Voice: (202) 626-7300
Orders: (800) 365-2724
Fax: (802) 864-7626
Email: aia@aia.org
Internet: http://www.aia.org

Uniform Drawing System
The Construction Specifications Institute
601 Madison Street
Alexandria, VA 22314-1791
Voice: (800) 689-2900
Fax: (703) 684-0465
Email: csimail@csinet.org
Internet: http://www.csinet.org

Metric Guide for Federal Construction, National CADD Standard
National Institute of Building Sciences (NIBS)
1201 L Street NW, Suite 400
Washington, DC 20005-4025
Voice: (202) 289-7800
Fax: (202) 289-1092
Email: nibs@nibs.org
Internet: http://www.nibs.org

Tri-Service CADD/GIS Technology Center
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Voice: (601) 634-4109
                (800) 522-6937, ext. 4109
Email: spangls@ex1.wes.army.mil
Internet: http://tsc.wes.army.mil

National CADD Plotting Standards
U.S. Coast Guard Civil Engineering Technology Center
1240 East 9th Street, Room 2195
Cleveland, OH 44199-2060
Voice: (216) 902-6210
Email: cgcetc@cgcetc.org
Internet: http://www.cgcetc.org/index.htm

Appendix A: CAD Layer Names

UAA CAD LAYER STANDARD			
GENERAL LAYER STANDARD NAMES			
LAYER NAME	**LAYER DESCRIPTION**	**COLOR**	**LINETYPE**
G-ACCS	Access Plan		
G-ANNO-NPLT	Construction lines, reference targets, View ports.		
G-ANNO-TTLB	General border and title block line work		
G-ANNO-TXT	General border text, notes, and drawing titles, Miscellaneous text and callouts with associated leader lines and arrowheads.		
G-ANNO-XREF	Reference Files		
G-CODE	Code compliance plan		
G-EVAC	Evacuation plan		
G-FIRE	Fire protection plan		
G-INFO	General information related to drawings.		
G-INFO-KPLN	Drawing key plan.		
G-INFO-NODE	Drawing nodes.		
G-PLAN	Floor plan-key plan		
G-SITE	Site Plan-key map		
CIVIL LAYER STANDARD NAMES			
C-BLDG	Proposed building footprint, existing buildings, satellite dishes		
C-COMM	Site communication/telephone poles, boxes, towers, satellite dishes.		
C-COMM-OVHD	Overhead communication lines		
C-COMM-UNDR	Underground communication lines		
C-FIRE	Fire protection-hydrants, connections		
C-FIRE-UNDR	Fire protection-underground lines		
C-NGAS	Natural gas-manholes, meters, storage tanks		
C-NGAS-UNDER	Natural gas-underground lines		
C-PKNG	Parking lot information.		
C-PKNG-CURB	Curbs, gutters, etc.		
C-PKNG-DRAN	Parking lot drainage slope indications		
C-PKNG-ISLD	Parking islands		
C-PKNG-JOIN	Control joints.		
C-PKNG-STRP	Parking lot striping, handicap symbol		
C-PKNG-STRU	Parking structures (benches, shelters, head bolt rails, etc.).		
C-PKNG-SURF	Parking lot surfaces.		
C-PKNG-TEXT	Snow removal & general information not related to specific items.		
C-PROP	Property lines, survey benchmarks		
C-PROP-BRNG	Bearings and distance labels		
C-PROP-CONS	Construction controls		
C-PROP-ESMT	Easement, rights-of-way, setback lines		

C-ROAD	Roadways		
C-ROAD-CNTR	Center lines		
C-ROAD-CURB	Curbs, gutters, etc.		
C-ROAD-JOIN	Control joints.		
C-ROAD-STRP	Road markings (striping, crosswalks, etc.).		
C-ROAD-SURF	Road surfaces, road base, etc.		
C-ROAD-SWLK	Sidewalks, stairs, bike paths, etc.		
C-ROAD-TEXT	Snow removal & general information not related to specific items.		
C-SITE-FNC	Fences		
C-SITE-TRL	Ski Trails		
C-SITE-UTIL	Utilidors & general utilities (specifics under their discipline)		
C-SSWR	Sanitary sewer-manholes, pumping stations		
C-SSWR-UNDR	Sanitary sewer-underground lines		
C-STRM	Storm drainage catch basins, manholes		
C-STRM-UNDR	Storm drainage pipe-underground		
C-TEXT	General civil notes & text not related to specific items.		
C-TOPO	Topological features, elevations		
C-TOPO-BORE	Test boring locations, bore logs		
C-TOPO-LN	Contour Lines		
C-TOPO-RTWL	Retaining wall		
C-TOPO-SPOT	Spot elevations		
C-TOPO-TXT	Elevation Text		
C-WATR	Domestic water-manholes, pumping stations, storage tanks		
C-WATR-UNDR	Domestic water-underground lines		
ARCHITECTURAL LAYER STANDARD NAMES			
A-AREA-PATT	Area cross hatching		
A-CLNG	**Ceiling features.**		
A-CLNG-ACCS	Ceiling access		
A-CLNG-FIN	Ceiling panels, finishes, etc.		
A-CLNG-GRID	Ceiling grid.		
A-CLNG-IDEN	Ceiling identification.		
A-CLNG-PENE	Ceiling system penetrations.		
A-CLNG-STRU	Ceiling support structure/elements, ie: astronomy domes, clerestories	253	
A-CLNG-SUSP	Suspended elements, soffits, cable trays		
A-CLNG-TEES	Main tees		
A-CLNG-TXT	General notes & text not specifically linked to an item.		
A-DETL	**Details**		
A-DETL-IDEN	Component identifications numbers		
A-DETL-MBND	Material beyond section cut		
A-DETL-MCUT	Material cut by section		
A-DETL-PATT	Textures and hatch patterns		
A-DOOR	**Doors & door features.**	2	
A-DOOR-FULL	Full height (to ceiling) doors.		

A-DOOR-IDEN	Door numbers, hardware groups, etc.		
A-DOOR-KEY	Key & lock core information.		
A-DOOR-KEYE	Electric locking device information (key switches, electric strike plates, etc).		
A-DOOR-MOVE	Folding door type partitions and curtains.		
A-DOOR-OH	Overhead doors, garage doors		
A-DOOR-PRHT	Partial height doors.		
A-DOOR-TXT	General notes & text concerning doors not specifically linked to an item.		
A-EQPM	**Equipment.**		
A-EQPM-ACCS	Equipment access & maintenance areas (lay down areas).		
A-EQPM-APPL	Fixed appliances.	171	
A-EQPM-CLNG	Ceiling-mounted or suspended equipment		
A-EQPM-ELEV	Equipment surfaces: 3D views		
A-EQPM-FIXD	Fixed equipment		
A-EQPM-IDEN	Equipment identification.		
A-EQPM-MOVE	Movable equipment and appliances.	181	
A-EQPM-NIC	Equipment not in contract		
A-EQPM-TXT	General notes & text not specifically linked to an item.		
A-FLOR	**Floor features.**		
A-FLOR-CASE	Casework (manufactured cabinets)		
A-FLOR-CATW	Catwalks, raised platforms, etc.	251	
A-FLOR-EVTR	Elevator cars, equipment, signage devices, etc.	5	
A-FLOR-FIN	Floor covering/finish information.		
A-FLOR-FIXT	Miscellaneous fixtures	21	
A-FLOR-HRAL	Handrails and guardrails.	251	
A-FLOR-LEVL	Changes in floor level, ie: ramps, depressions, pits, stages, equipment pedestals..		
A-FLOR-OTLN	Floor or building outline		
A-FLOR-OVHD	Overhead items (skylights, overhangs-usually dashed line)		
A-FLOR-PATT	Paving, tile, carpet patterns		
A-FLOR-RAIS	Raised floor systems.		
A-FLOR-RISR	Stair risers		
A-FLOR-SPCL	Special architectural features, ie: mezzanines, floor hatch doors	6 or 252	
A-FLOR-STREX	Exterior stairs, landings, loading docks, retaining walls, ramps	252	
A-FLOR-STRS	Interior stairs, ladders, escalators.		
A-FLOR-TXT	General notes & text not specifically linked to an item.		
A-FURN	**Furnishings.**		
A-FURN-CHAR	Chairs and other seating		
A-FURN-CURT	Windows curtains, blinds, etc.		
A-FURN-ELEV	Furniture: 3D views		
A-FURN-FILE	File cabinets		
A-FURN-FIX	Fixed furnishings (cabinets, casework, lab benches, display cases, bleachers, auditorium seating, etc.)	21	
A-FURN-FIX2	Upper Cabinets	21	hidden

A-FURN-MOVE	Movable furnishings.		
A-FURN-PATT	Finish patterns		
A-FURN-PLNT	Plants.		
A-FURN-PNLS	Furniture system panels		
A-FURN-POWR	Furniture system-power designations		
A-FURN-STOR	Furniture system storage components		
A-FURN-TXT	General notes & text not specifically linked to an item.		
A-FURN-WKSF	Furniture system work surface components		
A-GLAZ	**Window features.**	2	
A-GLAZ- ELEV	Glazing and mullions-elevation views		
A-GLAZ-BLOC	Glass block partitions and windows.		
A-GLAZ-FULL	Full height glazed walls and partitions.		
A-GLAZ-HNG	Hinge designations of windows	252	hidden
A-GLAZ-IDEN	Window numbers and identification.		
A-GLAZ-PRHT	Windows and partial height glazed walls.		
A-GLAZ-SILL	Windowsills		
A-GLAZ-TXT	General notes & text concerning windows not specifically linked to an item.		
A-IDEN	**Signage.**		
A-IDEN-EXT	Exterior signage.		
A-IDEN-INT	Interior signage.		
A-INV	**Inventory information.**		
A-INV-AREA	Room area delimiters.		
A-INV-DIV	Divisions of spaces not separated by physical wall	1	dashed
A-INV-OWNR	Room assignment information (operating unit, point-of-contact, etc.)		
A-INV-PART	Movable partitions defining separate spaces	5	hidden
A-INV-RMID	Square feet, assigned user, room type text	4	
A-INV-RMNO	Room numbers.	4	
A-INV-TXT	General notes & text not specifically linked to an item.		
A-ROOF	**Roof features.**		
A-ROOF-ELEV	Roof surfaces: 3d views		
A-ROOF-EQUIP	Roof equipment (antennas, compressors)		
A-ROOF-FIN	Roof surfaces/finishes.		
A-ROOF-IDEN	Roof identification.		
A-ROOF-LEVL	Roof level changes.		
A-ROOF-OTLN	Roof outline.	251	dashed
A-ROOF-PATT	Roof surface patterns, hatching		
A-ROOF-PENE	Roof penetrations.		
A-ROOF-TXT	General notes & text not specifically linked to an item.		
A-SECT	**Sections**		
A-SECT-IDEN	Component identifications numbers		
A-SECT-MBND	Material beyond section cut		
A-SECT-MCUT	Material cut by section		

A-SECT-PATT	Textures and hatch patterns		
A-WALL	**Architectural walls.**		
A-WALL-EXT	External Walls.	3	
A-WALL-INT	Interior partition walls (full height).	4	
A-WALL-INTP	Interior partition walls (partial height).	4	
A-WALL-MOVE	Movable partition walls.		
A-WALL-PEN	Interior animal pens, corrals, etc.	150	
A-WALL-SPCL	Fenced walls, security gates, pass-through	252	
A-WALL-TPTN	Toilet room partitions.	252	
A-WALL-TXT	General notes & text concerning walls not specifically linked to an item.		
STRUCTURAL LAYER STANDARD NAMES			
S-ABLT	Anchor bolts.		
S-BEAM	Beams, girders, etc.		
S-COLS	Columns.	5	
S-DECK	Structural floor deck		
S-FNDN	**Foundation.**		
S-FNDN-INSL	Foundation insulation & damp-proofing.		
S-FNDN-PILE	Piles and drilled piers.		
S-FNDN-RBAR	Foundation reinforcement.		
S-FNDN-REFG	Refrigerated pile features. (Active equipment shown on M-REFG.)		
S-FNDN-TXT	General notes & text not specifically linked to an item.		
S-FNDN-WALL	Foundation walls.	252	
S-FRAM	**Frames.**		
S-GRID	**Building grid lines.**		
S-GRID-EXT	Grid lines outside of building perimeter. Includes tags.		
S-GRID-INT	Grid lines inside building perimeter.		
S-IDEN	Structural frame identification.		
S-JOIS	Joists.		
S-METL	Misc. structural members.		
S-SLAB	**Slabs.**		
S-SLAB-EDGE	Edge of slab.		
S-SLAB-JOIN	Control joints.		
S-SLAB-RBAR	Slab reinforcement.		
S-SLAB-TXT	General notes, slab identification, & text not specifically linked to an item.		
S-TXT	General notes & text not specifically linked to an item.		
S-WALL	Structural bearing and shear walls.		
MECHANICAL LAYER STANDARD NAMES			
M-BRIN	**Specialized brine circulating systems. Not used for glycol systems.**		
M-BRIN-EQP	Brine system equipment.		
M-BRIN-PIPE	Brine system piping.		
M-BRIN-TXT	General notes & text not related to a specific item.		
M-CHIM	**Combustion stacks & chimneys.**		

M-CONT	Control system devices, schematics, diagrams, etc.		
M-CONT-DEV	Control system device locations (on layout drawings).	White	
M-CONT-DIA	Control system schematics, schedules, & diagrams.	White	
M-CONT-TXT	General notes & text not related to a specific item.	White	
M-CWTR	**Circulating cooling systems (chilled water & glycol based).**		
M-CWTR-EQPM	Heat exchangers, pumps, etc.	230	
M-CWTR-FLO	Circulating heating system flow (balancing) information.		
M-CWTR-PIPE	Circulating cooling water system piping, valves, etc.	211	
M-CWTR-TXT	General notes & text not related to a specific item.	171	
M-EXHS	**Exhaust system equipment & ducting.**	252	
M-EXHS-DIF	Exhaust system grilles, inlets, fume & grease hoods, etc.)		
M-EXHS-DUCT	Exhaust system ductwork.	101	
M-EXHS-EQPM	Exhaust system equipment.	101	
M-EXHS-FLO	Exhaust system flow (balancing) information.	101	
M-EXHS-TXT	General notes & text not related to a specific item.	101	
M-FUEL	**Fuel oil and special fuel systems.**		
M-FUEL-EQPM	Fuel oil system equipment (show burners layer with assoc. equip.).		
M-FUEL-PIPE	Fuel oil & special fuel piping.		
M-FUEL-SPL	Special system equipment (waste oil, etc.)		
M-FUEL-TXT	General notes & text not related to a specific item.		
M-HVAC	**Fan system equipment & ducting.**	4	
M-HVAC-DUCT	HVAC ductwork (OA, RA, SA, fire & smoke dampers, etc.).	4	
M-HVAC-EQPM	Fan system (fans, plenums, dampers, fan coils, etc.) equipment.	4	
M-HVAC-FLO	HVAC system flow (balancing) information.	4	
M-HVAC-RDFF	HVAC return air diffusers, transfer grilles, etc.	4	
M-HVAC-SDFF	HVAC supply air diffusers.	4	
M-HVAC-TERM	HVAC terminal equipment (VAV boxes, dual-duct boxes, CUHs, etc.)	4	
M-HVAC-TXT	General notes & text not related to a specific item.	21	
M-HOTW	**Circulating heating systems (hot water & glycol based).**		
M-HOTW-EQPM	Heat exchangers, pumps, boilers, etc.	4	
M-HOTW-FIN	Baseboard, finned-tube, UHs, etc.	212	
M-HOTW-FLO	Circulating heating system flow (balancing) information.	212	
M-HOTW-PIPE	Circulating heating water system piping, valves, etc.	110	
M-HOTW-TXT	General notes & text not related to a specific item.	212	
M-REFG	**Refrigeration equipment and systems.**		
M-REFG-EQPM	Refrigeration equipment (chillers, unit coolers, split system, ACCs, etc.).		
M-REFG-FLO	Refrigeration system flow (balancing) information.		
M-REFG-PIPE	Refrigerant piping, tower piping, valves, etc.		
M-REFG-TWR	Circulating heat rejection equipment (cooling towers, dry-coolers, etc.).		
M-REFG-TXT	General notes & text not related to a specific item.		
M-STEM	**Steam system equipment and piping.**		

M-STEM-EQPM	Heat exchangers, condensate return stations, PRV stations, etc.	4	
M-STEM-FLO	Steam system flow (balancing) information.		
M-STEM-PIPE	Condensate, LP, IP, & HP steam piping, valves, traps, etc.	10	
M-STEM-TXT	General notes & text not related to a specific item.	21	
M-TEXT	**General mechanical notes & text not assoc. with specific items.**		
ELECTRICAL LAYER STANDARD NAMES			
E-ALRM	**Miscellaneous alarm system**		
E-CLOK	**Clock system**		
E-COMM	**Communications and computer network information.**		
E-COMM-CIRC	Communication/network circuits.		
E-COMM-DIA	Communication/network riser diagrams.		
E-COMM-IDEN	Communication/network equipment identification.		
E-COMM-OTLT	Communications and network connection points/outlets.		
E-COMM-PANL	Communication/computer panels, switchgear, etc.	121	
E-COMM-RACE	Communication/network raceways (conduit, cable trays, etc.).		
E-COMM-TXT	General notes & text not specifically linked to an item.		
E-CTRL	**Electrical control separate from bldg mgt system.**		
E-CTRL-DEVC	Electrical control device locations (occ. sensors, strike plates, etc.).		
E-CTRL-WIRE	Control system wiring		
E-CTRL-DIA	Electrical control schematics, diagrams, etc.		
E-CTRL-TXT	General notes & text not specifically linked to an item.		
E-GRND	**Grounding.**		
E-GRND-CIRC	Grounding system circuits.		
E-GRND-DIAG	Ground system diagram		
E-GRND-EQUI	Equipotential ground system		
E-GRND-REFR	Referencing grounding system.		
E-GRND-TXT	General notes & text not specifically linked to an item.		
E-LEGN	**Legend of symbols**		
E-LITE	**Lighting fixtures, switching, circuits, etc.**		
E-LITE-CIRC	Normal lighting circuits including switching, occ sensors, photo cells, contactor	5	
E-LITE-CIRE	Emergency and exit lighting circuits.	1	
E-LITE-CLNG	Ceiling mounted fixtures.	7	
E-LITE-DLMP	Fixture present, lamps removed. 1 line=1 lamp removed	110	dashed
E-LITE-EMER	Emergency light fixtures (all mounting locations).	1	
E-LITE-EXIT	Exit lights.	94	
E-LITE-FLOR	Floor mounted fixtures.		
E-LITE-IDEN	Fixture identification.	120	
E-LITE-LEVL	Current, as found/as left, light levels in fc's	80	
E-LITE-NITE	Lights on 24 hours a day	4	
E-LITE-SITE	Exterior area/security lighting, street/parking lighting (pole, pedestal, etc.)		
E-LITE-SPCL	Special light fixtures.		
E-LITE-TXT	General notes & text not specifically linked to an item.	7	

E-LITE-WALL	Wall mounted fixtures (both interior & exterior).		
E-LTNG	**Lightning protection system**		
E-POWR	**Electrical power features.**		
E-POWR-CIRC	Normal power distribution circuits.	1	
E-POWR-CIRE	Emergency power circuits, uninterrupted power source		
E-POWR-DIA	Power and lighting riser diagram.		
E-POWR-IDEN	Electrical power equipment identification.		
E-POWR-OTLT	Power outlets (wall receptacles, multi-outlet floor boxes, etc.).	120	
E-POWR-PANL	Power panels, switchgear, load centers, transformers.	5	
E-POWR-RACE	Power raceways (conduit, busduct, cable trays, j-boxes, etc.).		
E-POWR-SITE	Site power distribution/transmission (overhead & underground).		
E-POWR-TXT	General notes & text not specifically linked to an item.		
E-SEC	**Security**		
E-SEC-MD	**Motion Detectors**	5	
PLUMBING LAYER STANDARD NAMES			
P-GWTR	**Gray (non-potable) water system piping and equipment.**		
P-GWTR-FIXT	Gray water fixtures.		
P-GWTR-PIPE	Gray water piping, valves, etc.		
P-GWTR-TXT	General notes & text not related to a specific item.		
P-LAB	**Air, vacuum, specialized lab gas, etc. systems.**		
P-LAB-AIR	Compressed air piping & equipment for labs, controls, process, etc.		
P-LAB-GAS	Natural gas & specialized lab gases equipment & piping.		
P-LAB-LPG	Lab, process, & fuel propane (& other LPGs) equipment & piping.		
P-LAB-SPL	Lab & process acids, bases, etc. equipment & piping.		
P-LAB-TXT	General notes & text not related to a specific item.		
P-LAB-VAC	Laboratory & process vacuum system equipment & piping.		
P-LAB-WTR	Lab & process special water (i.e., DI, RO, etc.) equipment & piping.		
P-PWTR	**Potable water system piping and equipment.**		
P-PWTR-EQP	Potable water equipment (hot water heaters, pumps, etc.).		
P-PWTR-PIPE	Potable hot & cold water piping, valves, trap primers, back-flow preventers, etc.		
P-PWTR-TXT	General notes & text not related to a specific item.		
P-SANR	**Sanitary sewer drain, waste, & vent systems.**		
P-SANR-EQPM	Sanitary sewer equipment (pumps, lift stations, ejectors, etc.)		
P-SANR-FIXT	Plumbing fixtures (sinks, urinals, water closets, etc.).		
P-SANR-PIPE	Sanitary DWV piping, floor drains, air gap fitting, etc.		
P-SANR-TXT	General notes & text not related to a specific item.		
P-STRM	**Storm drainage drain, waste, and vent systems.**	70	
P-STRM-EQPM	Storm drainage equipment (pumps, lift stations, ejectors, etc.)		
P-STRM-PIPE	Storm system DWV piping, roof drains, catchments, etc.		
P-STRM-TXT	General notes & text not related to a specific item.		
P-TEXT	**General plumbing notes & text not assoc. with specific items.**		
FIRE ALARM LAYER STANDARD NAMES			
F-ALRM	**Fire alarm systems (detection, signaling, annunciation, etc.).**		

F-ALRM-ANN	Strobe, horn, door locks, annunciation panel, fire panel		
F-ALRM-DIA	Fire alarm system schematics, diagrams, risers, etc.		
F-ALRM-DTCT	Fire alarm detectors and devices, smoke alarms		
F-ALRM-EQPM	Fire alarm equipment (fire alarm control panels, annunciators, etc.).		
F-ALRM-TEXT	General fire alarm notes & text not assoc. with specific items.		
F-PROT	**Fire protection systems (sprinklers, dry-chem, Halon, etc.).**		
F-PROT-CO2S	Carbon dioxide fire protection system equipment & piping.		
F-PROT-DSPR	Dry-pipe & pre-action sprinkler system equipment, piping, & heads.		
F-PROT-HALN	Halon fire protection system equipment & piping.		
F-PROT-STAN	Standpipe fire protection system equipment, piping, hose cabinets, etc.		
F-PROT-TEXT	General fire protection notes & text not assoc. with specific items.		
F-PROT-WSPR	Wet-pipe & deluge sprinkler system equipment, piping, & heads.		
TELECOMMUNICATIONS LAYER STANDARD NAMES			
T-ADDR	**IP address**		
T-CABL	**Cable Plan**		
T-DIAG	**Diagram/circuit**		
T-EQPM	**Equipment Plan**		
T-GRND	**Grounding & bonding**		
T-JACK	**Data/telephone/video jacks**		
T-RACE	**Raceways**		
T-TELE-PUB	**Public Telephone**		
T-TLEL-EMRG	**Emergency Telephone**		
T-TEXT	**General telecommunication notes & text not assoc. with specific items**		

End of Appendix A- CAD Layer Standards