Planning and Organizing a CEE Drawing: What goes into a drawing sets for a CEE Project?

Components of a CEE Drawing Set

- Group exercise: Consider drawings of a structure.
  - What kind of structure is it?
  - What different systems will be constructed as part of this project: foundations, telecommunications, structures, mechanical, electrical, etc.
  - What drawings do you have? What drawings are missing?
  - How are the drawings organized? How do you know what page to look on for information about a particular component?

National CAD Standards for Creating Drawing Sets

- CAD Layer Guidelines (AIA):
  - Organization of drawing sets & list of layers that may be included
  - Format for naming layers in CAD
- Plotting Guidelines (US CADD/GIS Tech. Center)
  - Color in AutoCAD file, plotted line width & plotted color
- The Construction Specification Institute
  - Drawing set organization
  - Drawing sheet organization
  - Schedule organization
  - Drafting conventions
  - Terms and Abbreviations
  - Symbols
  - Notations

http://www.nationalcadstandard.org

Drawing Set Hierarchy

Standard Sheet Identification

- Discipline Designator
  - AANNNUU

- Sheet Type Designator
  - AANNNUUU

- Sheet Sequence Number
  - AANNNUUU

- User-Defined Designator
  - AANNNUUU

Sheet Org.: Discipline Designator

<table>
<thead>
<tr>
<th>A - N N N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 Discipline Designator Only</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>General</td>
</tr>
<tr>
<td>Hazardous Materials</td>
</tr>
<tr>
<td>Survey/Mapping</td>
</tr>
<tr>
<td>Geotechnical</td>
</tr>
<tr>
<td>Civil Works</td>
</tr>
<tr>
<td>Civil</td>
</tr>
<tr>
<td>Landscape</td>
</tr>
<tr>
<td>Structural</td>
</tr>
<tr>
<td>Architectural</td>
</tr>
<tr>
<td>Interior</td>
</tr>
<tr>
<td>Equipment</td>
</tr>
<tr>
<td>A - Architectural</td>
</tr>
<tr>
<td>Z - Contractor / Shop Drawings</td>
</tr>
<tr>
<td>T - Information</td>
</tr>
<tr>
<td>Fire Protection</td>
</tr>
<tr>
<td>Plumbing</td>
</tr>
<tr>
<td>Geotechnical</td>
</tr>
<tr>
<td>Electrical</td>
</tr>
<tr>
<td>Telecommunications</td>
</tr>
<tr>
<td>Resources</td>
</tr>
<tr>
<td>Other Disciplines</td>
</tr>
</tbody>
</table>

A - N N N

Level 2 Discipline Designator w/ modifier character

- Architectural
- Site Plan
- Protection & Removal
- Interior Finishes
Sheet Org.: Sheet Type

AA NNN

- 0 General (symbols legend, notes, etc.)
- 1 Plans (horizontal views)
- 2 Elevations (vertical views)
- 3 Sections (sectional views)
- 4 Large Scale Views (plans, elevations, sections)
- 5 Details
- 6 Schedules and Diagrams
- 7 User Defined
- 8 User Defined
- 9 3D Representations (isometrics, perspectives, photographs)

Sheet Org.: Sheet Sequence

AA NNN

The sheet sequence number identifies each sheet in a series of the same discipline and sheet type.
The first sheet of each series is numbered 01, followed by 02 through 99.

Sheet Org.: User-Defined

AA NNUUU

Examples - Supplemental Drawings

- A - 1 0 2 R 1 (partially revised floor plan)
- A - 1 0 2 X 1 (totally revised floor plan)
- A - 1 0 2 A 1 (Phase 1 of a sequenced construction floor plan)

Sample Typical Drawing Set

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Sheet Title</th>
<th>Drawing Set Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-001</td>
<td>Cover Sheet</td>
<td>UDS establishes organization and provides consistency among disciplines.</td>
</tr>
<tr>
<td>A-010</td>
<td>Notes and Symbols</td>
<td>Thus, a floor plan may be located and identified as:</td>
</tr>
<tr>
<td>A-102</td>
<td>Floor Plan</td>
<td>S - 101 Structural First Floor Plan</td>
</tr>
<tr>
<td>A-103</td>
<td>Roof Plan</td>
<td>A - 101 Architectural First Floor Plan</td>
</tr>
<tr>
<td>A-201</td>
<td>Exterior Elevations</td>
<td>M - 101 Mechanical First Floor Plan</td>
</tr>
<tr>
<td>A-301</td>
<td>Building Sections</td>
<td>E - 101 Electrical First Floor Plan</td>
</tr>
<tr>
<td>A-302</td>
<td>Wall Sections</td>
<td></td>
</tr>
<tr>
<td>A-401</td>
<td>Enlarged Toilet Plan</td>
<td></td>
</tr>
<tr>
<td>A-501</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>A-601</td>
<td>Room Finish Schedule</td>
<td></td>
</tr>
<tr>
<td>A-602</td>
<td>Door &amp; Window Schedules</td>
<td></td>
</tr>
</tbody>
</table>

Sample Typical Drawing Set

AIA CAD Layer Guidelines

AA - Level 1 Discipline Designator

- G General
- H Hazardous Materials
- K Survey/Mapping
- N Geotechnical
- C Civil/Structural
- S Landscape
- T Structural
- L Architectural
- E Interior
- M Mechanical
- X Operations
- B Civil
- V Telecommunications
- N Resources
- D Process
- R Other Disciplines
- P Plumbing
- W Electrical
- Q Design

CAD Layer Name: Discipline Designator

AA - Level 2 - modifier character

As for Drawing Numbering

<table>
<thead>
<tr>
<th>Designator</th>
<th>Description</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Architecture</td>
<td>Any of above</td>
</tr>
<tr>
<td>A5</td>
<td>Architectural Site</td>
<td>Site Plan</td>
</tr>
<tr>
<td>AD</td>
<td>Architectural Demo.</td>
<td>Protection &amp; Removal</td>
</tr>
<tr>
<td>AI</td>
<td>Architectural Interiors</td>
<td>Interior Finishes</td>
</tr>
</tbody>
</table>
CAD Layer Name: Major Group

The mandatory Major Group field is a four-character field that identifies a major building system. The prescribed Major Group field codes (four-character abbreviations) show on the Layer List are logically grouped with specific discipline designators. However, any Major Group may be combined with any prescribed Discipline Designator, provided that the definition of the Major Group remains unchanged. User-defined Major Group field codes are not permitted.

Examples:
- V* - BLDG - * Surveying / mapping – buildings and primary structures
- V* - POWR - * Surveying / mapping – power
- B* - BORE - * Geotechnical – borings
- S* - BEAM - * Structural – beams
- A* - DOOR - * Architectural – doors
- AI – WALL - * Architectural Interior – walls

CAD Layer Name: Minor Groups

The optional Minor Group fields are four-character fields that provide further clarification of information contained on a layer. The prescribed Minor Group field codes (four-character abbreviations) show on the Layer List are logically grouped with specific discipline designators. However, any Major Group may be combined with any prescribed Discipline Designator, provided that the definition of the Major Group remains unchanged. User-defined Minor Group field codes are permitted.

Examples:
- V* - BLDG - DECK Surveying / mapping – buildings - outdoor decks
- V* - POWR - MHOL Surveying / mapping – power - manholes
- B* - BORE - FDTA Geotechnical – borings – field data
- C* - DRIV - FLNE - SIGN Civil – driveways – fire lane – pavement markings
- S* - BEAM - STEL Structural – beams – steel
- A* - DOOR - FULL Architectural – doors – full height
- AI – WALL - FIRE Architectural Interior – walls – fire wall

CAD Layer Name: Status

The optional Status field is a one-character field that distinguishes the data contained on the layer according to the status of the work or the construction phase. The prescribed field codes are as follows:

N New work
E Existing to remain
D Existing to demolish
F Future work
T Temporary work
M Items to be moved
X Not in contract
1-9 Phase numbers

Organizing Drawing Information

- Structure for identifying spaces, objects, components
- Reference Symbols
- Notes
  - General
  - Reference Keynotes
  - Sheet Keynotes

Identifying Spaces, Objects

Components

Multiple Views – The CEE Perspective
### Reference Keynotes:

**Masterformat for specifications (CSI)**

<table>
<thead>
<tr>
<th>Division</th>
<th>Specification</th>
<th>Division</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General Ref.</td>
<td>9</td>
<td>Finishes</td>
</tr>
<tr>
<td>2</td>
<td>Sitework</td>
<td>10</td>
<td>Specialties</td>
</tr>
<tr>
<td>3</td>
<td>Concrete</td>
<td>11</td>
<td>Equipment</td>
</tr>
<tr>
<td>4</td>
<td>Masonry</td>
<td>12</td>
<td>Furnishings</td>
</tr>
<tr>
<td>5</td>
<td>Metals</td>
<td>13</td>
<td>Special Constr.</td>
</tr>
<tr>
<td>6</td>
<td>Wood &amp; Plastics</td>
<td>14</td>
<td>Conveying Systems</td>
</tr>
<tr>
<td>7</td>
<td>Thermal &amp; Moisture Protection</td>
<td>15</td>
<td>Mechanical</td>
</tr>
<tr>
<td>8</td>
<td>Doors &amp; Windows</td>
<td>16</td>
<td>Electrical</td>
</tr>
</tbody>
</table>

- **Division**: Use same specification number that reference number
- **Decimal Point**: Separate the rest from the suffix
- **Suffix**: Must be an optional user-defined 2-digit number
- **Prefix**: User-defined, single alpha character

### Notes

- **Order of Sequence**: General Notes, Reference Notes, Sheet Keynotes
- **Reference Keynotes**:
  - 03090.A REFRENCING STEEL
  - 03090.A WELDED WIRE MESH
  - 03090.A CEMENT, READY MIX CONCRETE

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Sheet Keynotes

1. Existing Floor Plan
2. Dashed Line Indicating Support Above