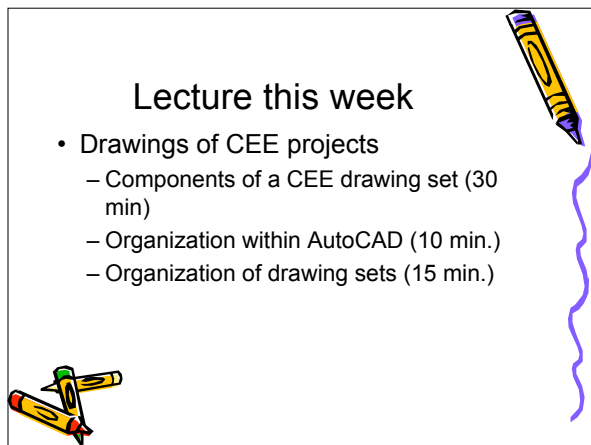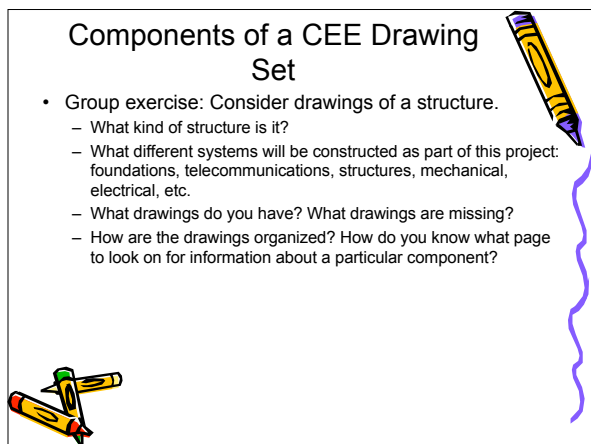# CEE 498 – Spring 2005

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

Lecture this week

- Drawings of CEE projects
  - Components of a CEE drawing set (30 min)
  - Organization within AutoCAD (10 min.)
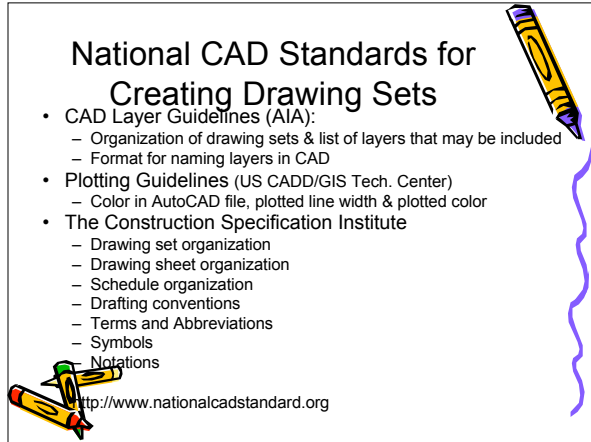 - Organization of drawing sets (15 min.)

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?
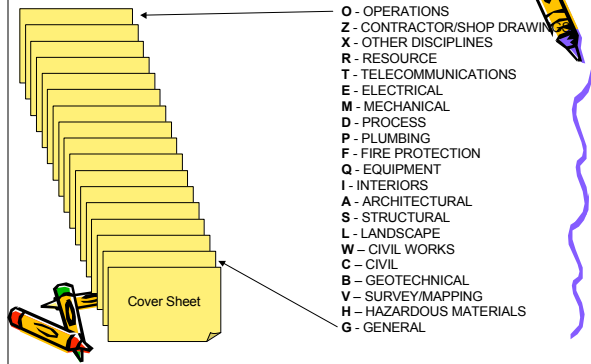
National CAD Standards for Creating Drawing Sets

- 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

O - OPERATIONS
Z - CONTRACTOR/SHOP DRAWINGS
X - OTHER DISCIPLINES
R - RESOURCE
T - TELECOMMUNICATIONS
E - ELECTRICAL
M - MECHANICAL
D - PROCESS
P - PLUMBING
F - FIRE PROTECTION
Q - EQUIPMENT
I - INTERIORS
A - ARCHITECTURAL
S - STRUCTURAL
L - LANDSCAPE
W – CIVIL WORKS
C – CIVIL
B – GEOTECHNICAL
V – SURVEY/MAPPING
H – HAZARDOUS MATERIALS
G - GENERAL

Cover Sheet

Standard Sheet Identification

Standard Sheet Identification
- **discipline designator**
- **sheet type designator**
- **sheet sequence number**
- **user-defined designator**

A = alphabetical character
N = numerical character
U = user-defined

A A N N N U U U
Discipline Designators
A A **N** N N U U U
Sheet Type Designator
A A N **N N** U U U
Sheet Sequence Number
A A N N N **U U U**
User-Defined Designator
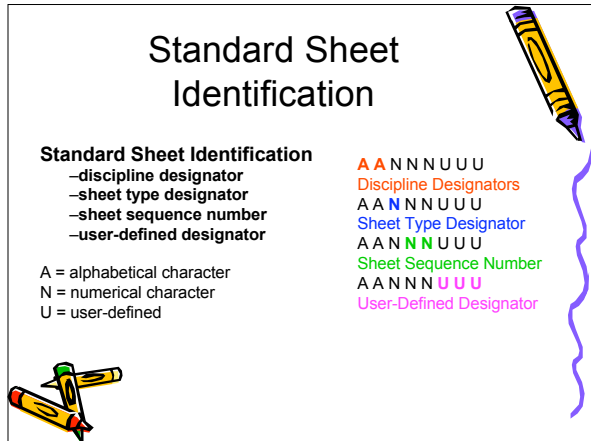
Sheet Org.: Discipline Designator

A - N N N

Level 1 Discipline Designator Only

G	General	**F**	Fire Protection
H	Hazardous Materials	**P**	Plumbing
V	Survey/Mapping	**D**	Process
B	Geotechnical	**M**	Mechanical
W	Civil Works	**E**	Electrical
C	Civil	**T**	Telecommunications
L	Landscape	**R**	Resources
S	Structural	**X**	Other Disciplines
A	Architectural	**Z**	Contractor / Shop Drawings
I	Interior	**O**	Operations
Q	Equipment		

A A N N

Level 2 Discipline Designator w/modifier character

Designator	Description	Content
A	Architectural	Any or all
	Architectural Site	Site Plan
	Architectural Demolition	Protection & Removal
	Architectural Interiors	Interior Finishes

Sheet Org.: Sheet Type Designator

A A N N

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 Number

A A N N

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.
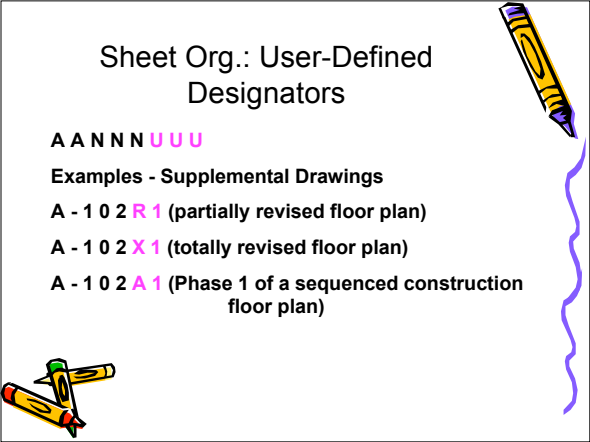
Sheet Org.: User-Defined Designators

A A N N N U U U

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

Sheet	Sheet Title
G-001	Cover Sheet
A-001	Notes and Symbols
A-101	Floor Plan
A-102	Reflected Ceiling Plan
A-103	Roof Plan
A-201	Exterior Elevations
A-301	Building Sections
A-302	Wall Sections
A-401	Enlarged Toilet Plan
A-501	Details
A-601	Room Finish Schedule
A-601	Door & Window Schedules

Drawing Set Consistency
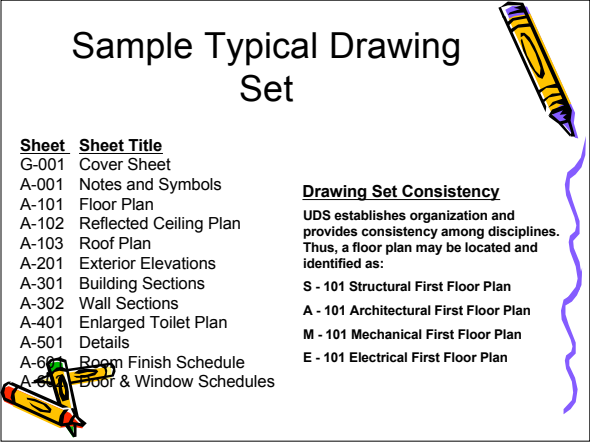
UDS establishes organization and provides consistency among disciplines. Thus, a floor plan may be located and identified as:

S - 101 Structural First Floor Plan

A - 101 Architectural First Floor Plan

M - 101 Mechanical First Floor Plan

E - 101 Electrical First Floor Plan

AIA CAD Layer Guidelines

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-	N

Discipline Designator
Major Group
Minor Group 1
Minor Group 2
Status

CAD Layer Name: Discipline Designator

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-

As for Drawing Numbering

AA - Level 1 Discipline Designator

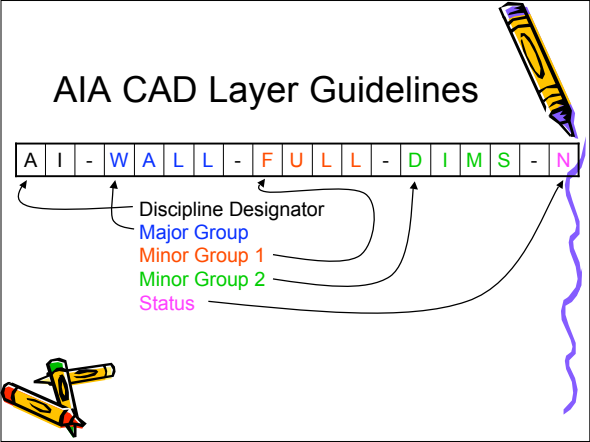|			
G General		**F** Fire Protection
H Hazardous Materials		**P** Plumbing
V Survey/Mapping		**D** Process
B Geotechnical		**M** Mechanical
W Civil Works		**E** Electrical
C Civil		**T** Telecommunications
L Landscape		**R** Resources
S Structural		**X** Other Disciplines
A Architectural		**Z** Contractor / Shop Drawings
I Interior		**O** Operations
Q Equipment		

AA - Level 2 - modifier character

Designator	Description	Content
A	Architectural	Any or all
AS	Architectural Site	Site Plan
AD	Architectural Demo.	Protection & Removal
AI	Architectural Interiors	Interior Finishes

CAD Layer Name: Major Group

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-

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
C* - DRIV - *	Civil – driveways
S* - BEAM - *	Structural – beams
S* - FNDN - *	Structural – foundations
A* - DOOR - *	Architectural – doors
AI - WALL - *	Architectural Interior – walls

CAD Layer Name: Minor Groups

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-

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
S* - FNDN - PIER	Structural – foundations – drilled piers
A* - DOOR - FULL	Architectural – doors – full height
AI - WALL - FIRE	Architectural Interior – walls – fire wall

CAD Layer Name: Status

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-

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

Identifying Spaces and Objects

151   STORAGE   151

152 A   OFFICE   152

152 B

Each door is to have a unique identifier; if a room has one door, the door number is the same as the secure side room number.

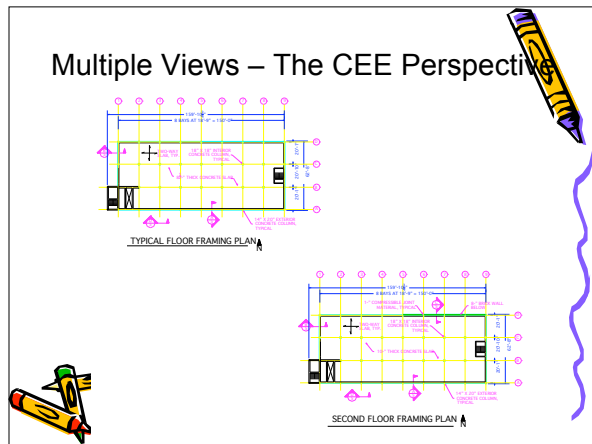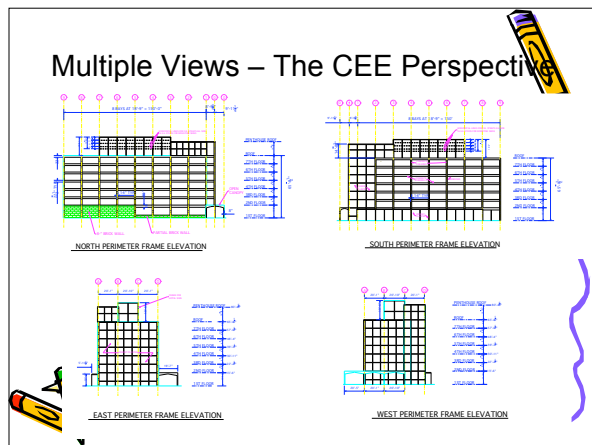In rooms with multiple doors, the door number is followed by an alpha character.

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Column Grid Lines
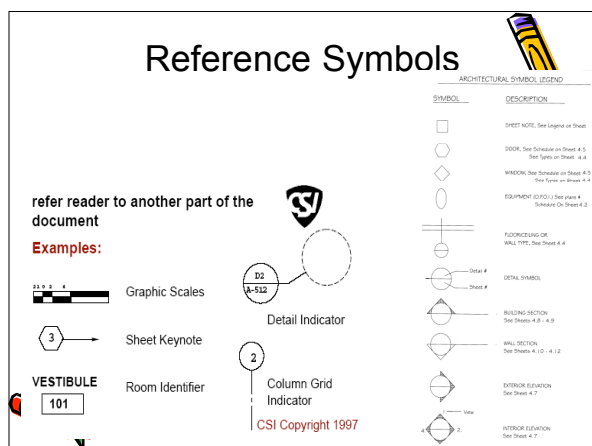
1 2 3 4 5

D C B A

Vertical grid lines are located across the top and are numbered from left to right.

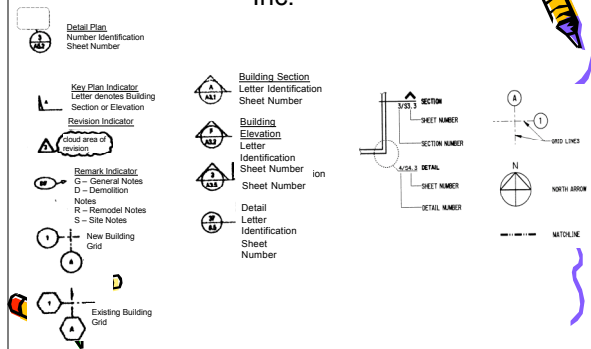Horiz. grid lines are located to the right and are alphabetized from bottom to top.

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Multiple Views – The CEE Perspective

TYPICAL FLOOR FRAMING PLAN

SECOND FLOOR FRAMING PLAN

Multiple Views – The CEE Perspective

NORTH PERIMETER FRAME ELEVATION

SOUTH PERIMETER FRAME ELEVATION

EAST PERIMETER FRAME ELEVATION

WEST PERIMETER FRAME ELEVATION

Reference Symbols

refer reader to another part of the document

Examples:

Graphic Scales

Sheet Keynote

VESTIBULE 101 — Room Identifier

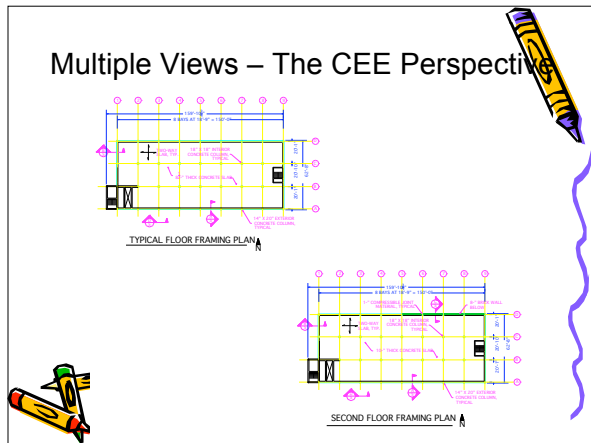D2 A-512 — Detail Indicator

2 — Column Grid Indicator

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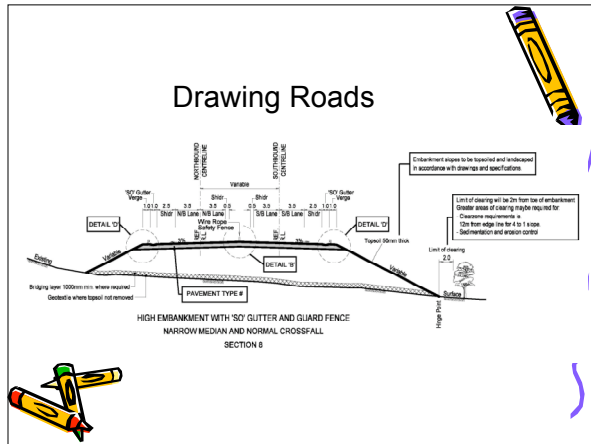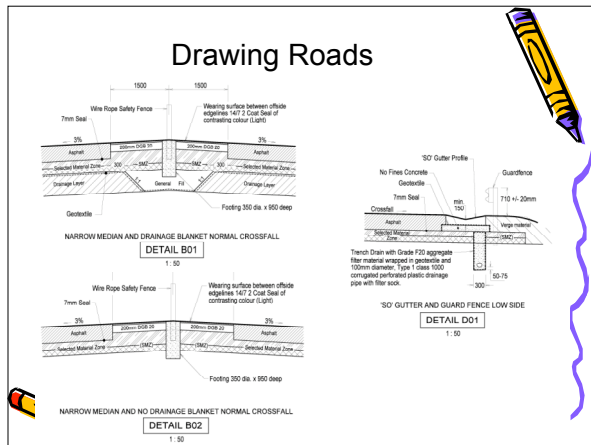## Reference Symbols: Examples from Skilling Ward Magnusson Barkshire Inc.

Detail Plan
Number Identification
Sheet Number

Key Plan Indicator
Letter denotes Building
Section or Elevation

Revision Indicator
cloud area of
revision

Remark Indicator
G – General Notes
D – Demolition
Notes
R – Remodel Notes
S – Site Notes

New Building
Grid

Existing Building
Grid

Building Section
Letter Identification
Sheet Number

Building
Elevation
Letter
Identification
Sheet Number

Detail
Letter
Identification
Sheet
Number

SECTION
SHEET NUMBER
SECTION NUMBER
DETAIL
SHEET NUMBER
DETAIL NUMBER

GRID LINES

NORTH ARROW

MATCHLINE
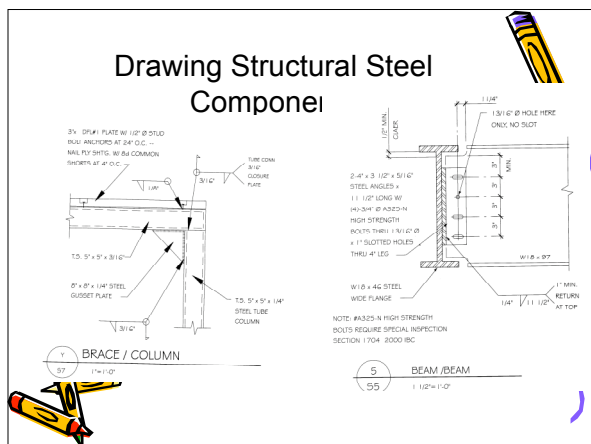
Multiple Views – The CEE Perspective

TYPICAL FLOOR FRAMING PLAN

SECOND FLOOR FRAMING PLAN

Section Views – The CEE Perspective

TYPICAL COLUMN DETAIL

SECTION OF BRICK WALL

TYPICAL TRANSVERSE SPANDRELS

TYPICAL LONGITUDINAL SPANDRELS

Drawing Roads

Drawing Roads

Drawing Structural Steel Components

Drawing RC Structural
onents

Notes

Order of Sequence:

General Notes
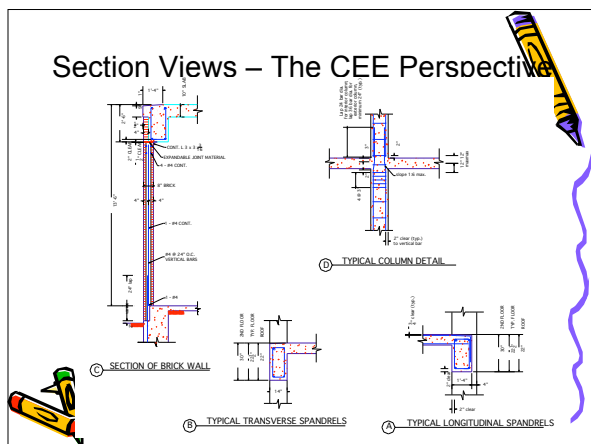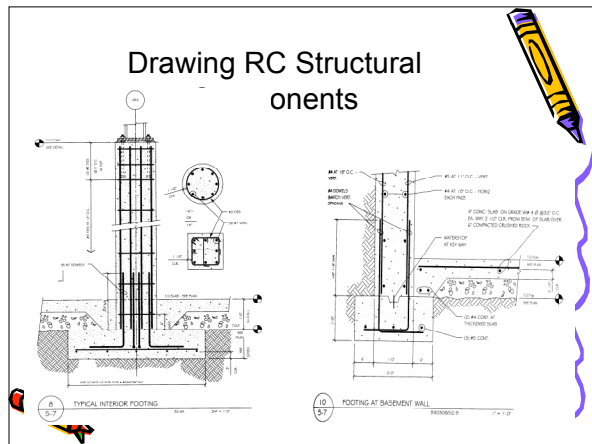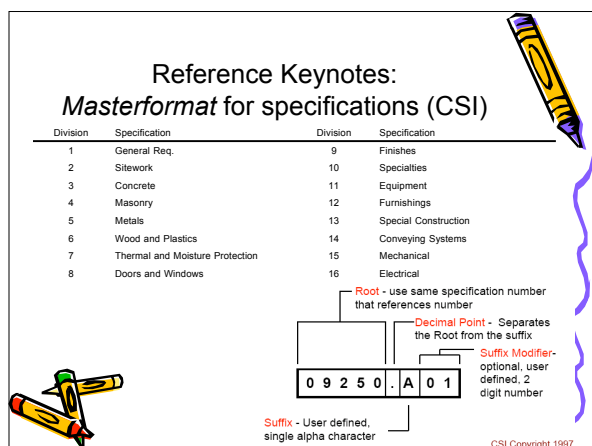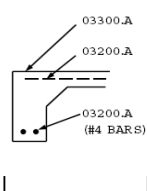
Reference Notes

Sheet Keynotes

Reference Keynotes:
Masterformat for specifications (CSI)

Division	Specification	Division	Specification
1	General Req.	9	Finishes
2	Sitework	10	Specialties
3	Concrete	11	Equipment
4	Masonry	12	Furnishings
5	Metals	13	Special Construction
6	Wood and Plastics	14	Conveying Systems
7	Thermal and Moisture Protection	15	Mechanical
8	Doors and Windows	16	Electrical

Root - use same specification number
that references number

Decimal Point - Separates
the Root from the suffix

Suffix Modifier- optional, user
defined, 2 digit number

`0 9 2 5 0 . A 0 1`

Suffix - User defined,
single alpha character

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10

Reference Keynotes

03300.A
03200.A
03200.A
(#4 BARS)

REFERENCE KEYNOTES

DIVISION 3 - CONCRETE
03200.A REINFORCING STEEL
03200.B WELDED WIRE MESH
03300.A CAST-IN-PLACE CONCRETE
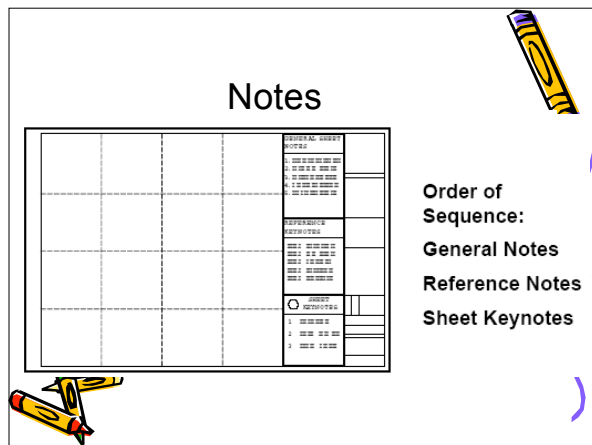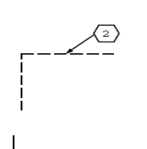
Reference Keynotes
in Drawing Block

Reference Keynotes
in Note Block

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Sheet Keynotes

2

SHEET KEYNOTES

1   EXISTING FLOOR DRAIN

2   DASHED LINE INDICATES
     SOFFIT ABOVE

Sheet Keynotes
in Drawing Block

Sheet Keynotes
in Note Block

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