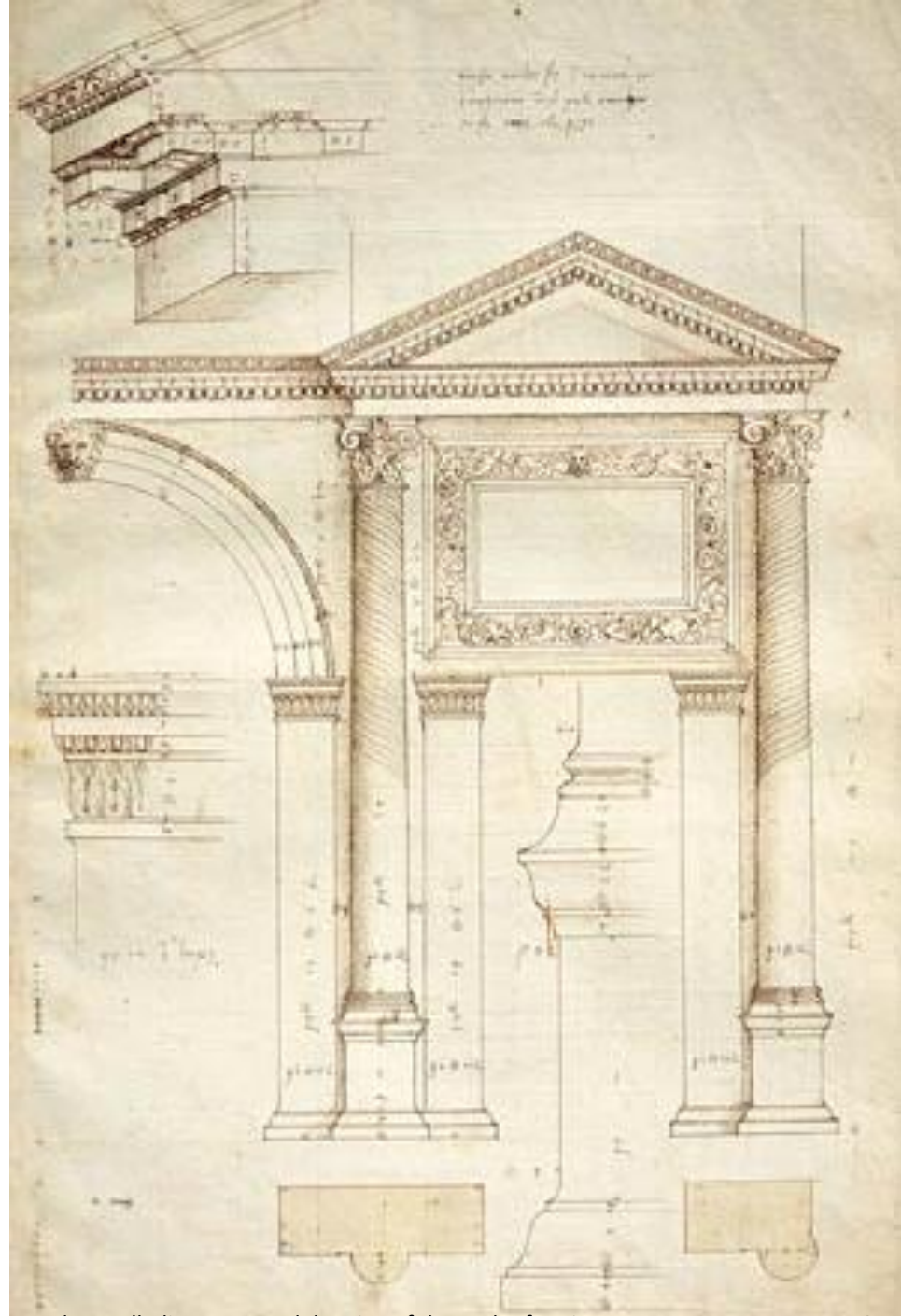


CMCE 1110 - Construction Drawings I
Lesson 6: Scale Drawings
Cellar Plan and
Foundation Detail

Professor Anderson

scaleofuniverse.com

To Scale: The Solar System



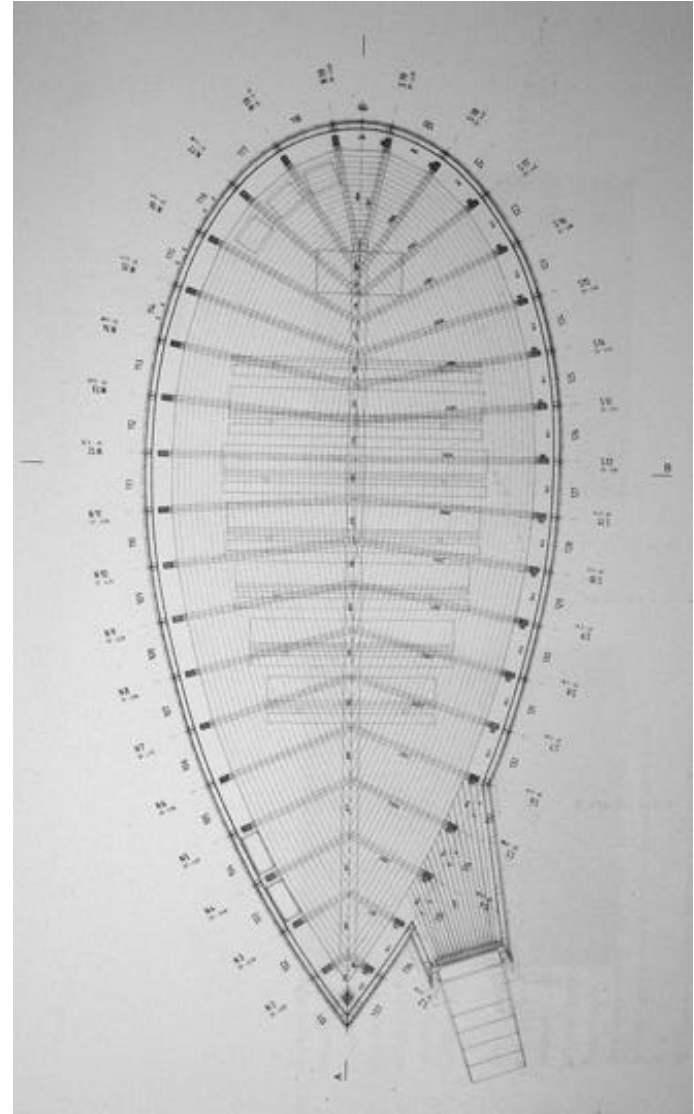
Andrea Palladio, Measured drawing of the Arch of Jupiter Ammon, Verona, ca. 1540

SCALE:

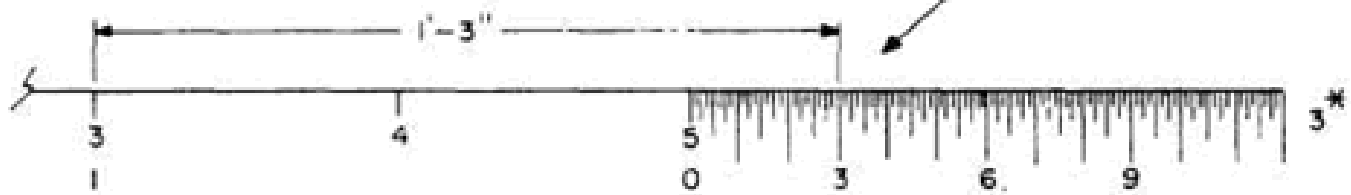
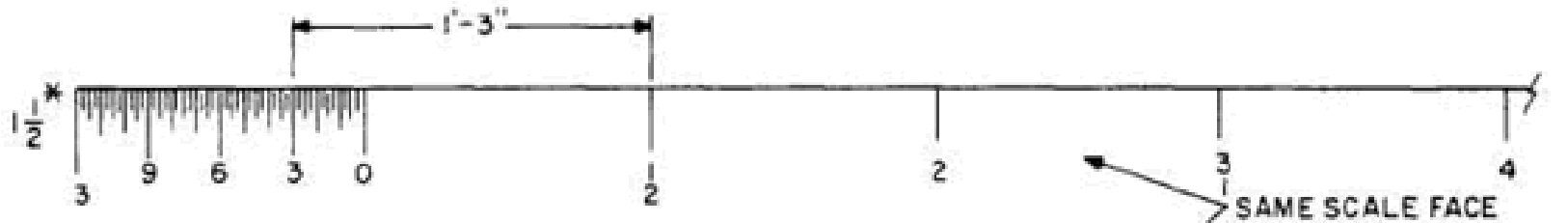
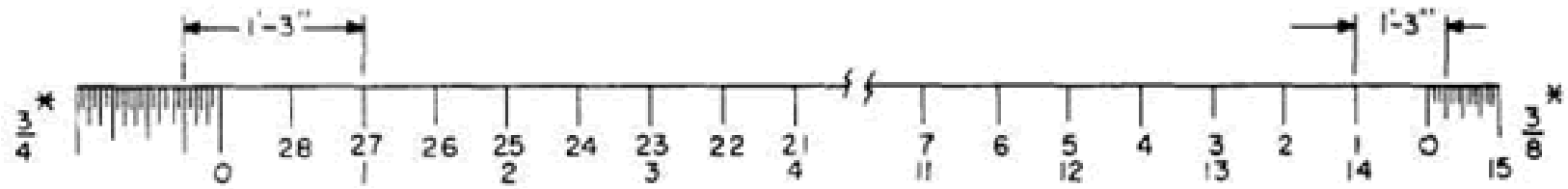
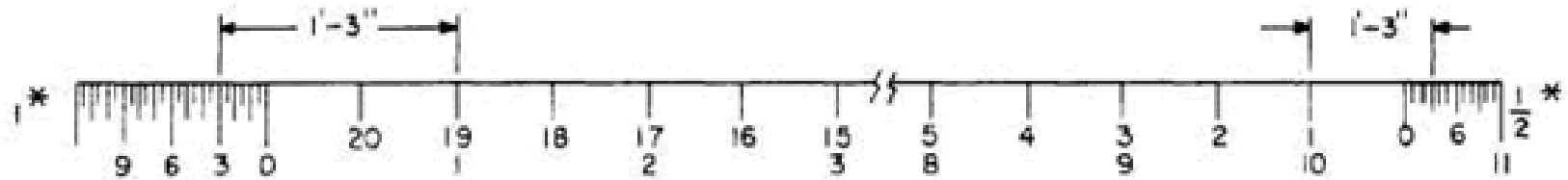
A RATIO THAT COMPARES THE ACTUAL MEASUREMENTS OF AN OBJECT WITH THE REPRESENTATIONAL DRAWING



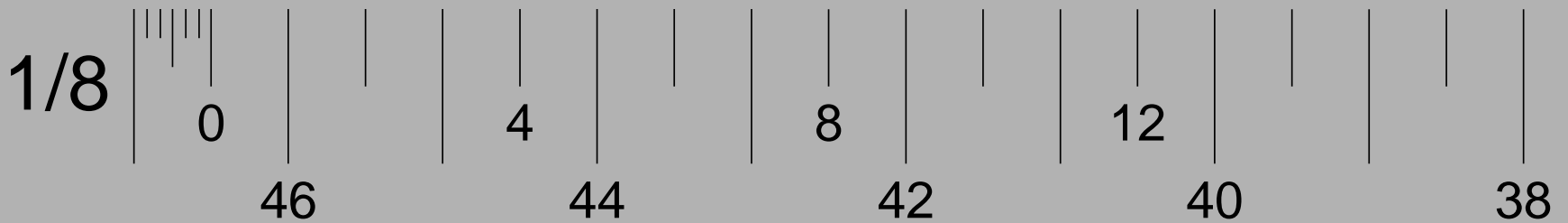
Saint Benedict Chapel, Surnitg, Graubünden, Switzerland, 1988
Photo by Helene Buser



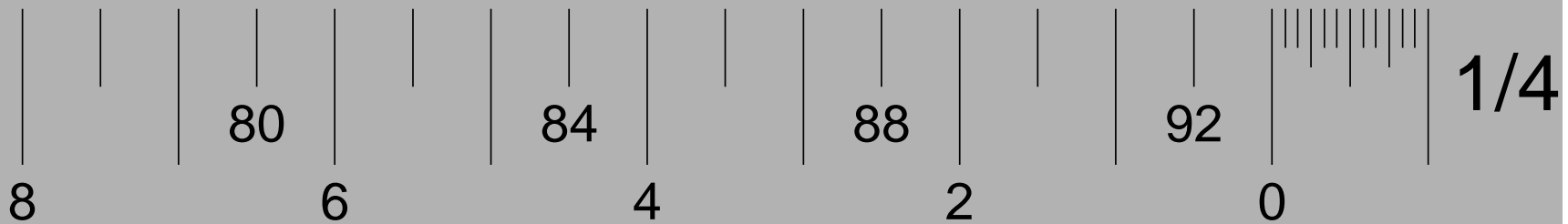
Architectural Scale



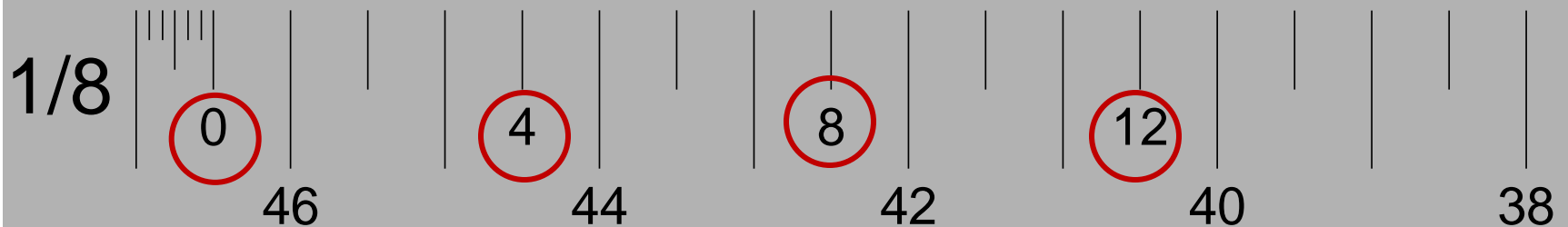
The left side begins with 1/8" scale



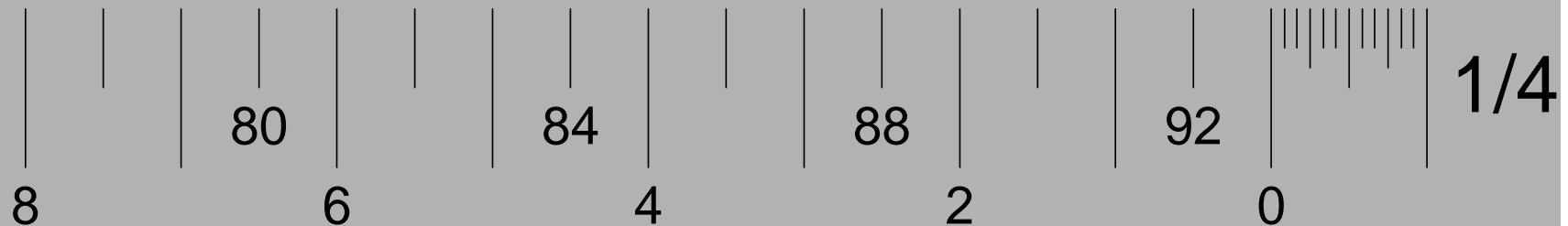
... and the right side begins with 1/4" scale



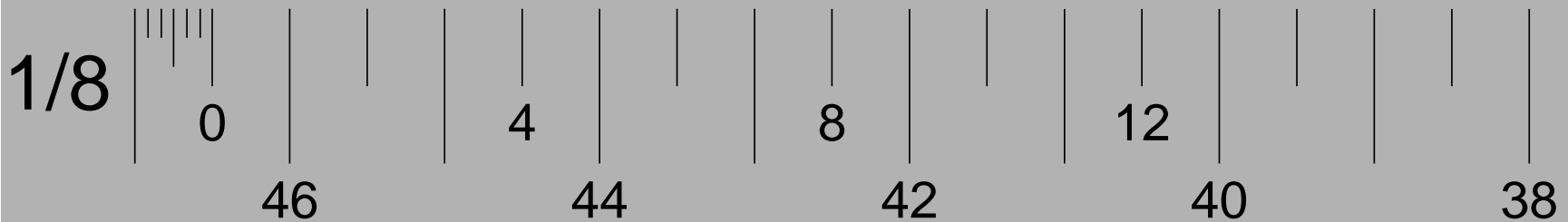
The left side begins with 1/8" scale



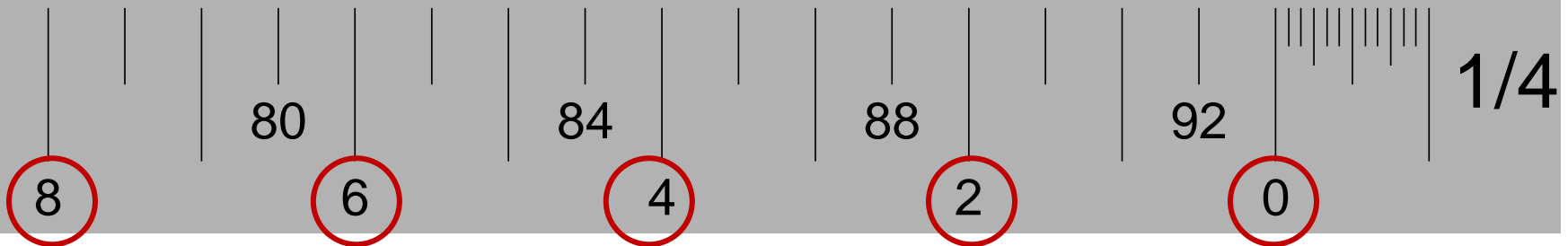
**Look at the 1/8" scale and read from left to right.
The upper numbers represent feet.**



The left side begins with 1/8" scale



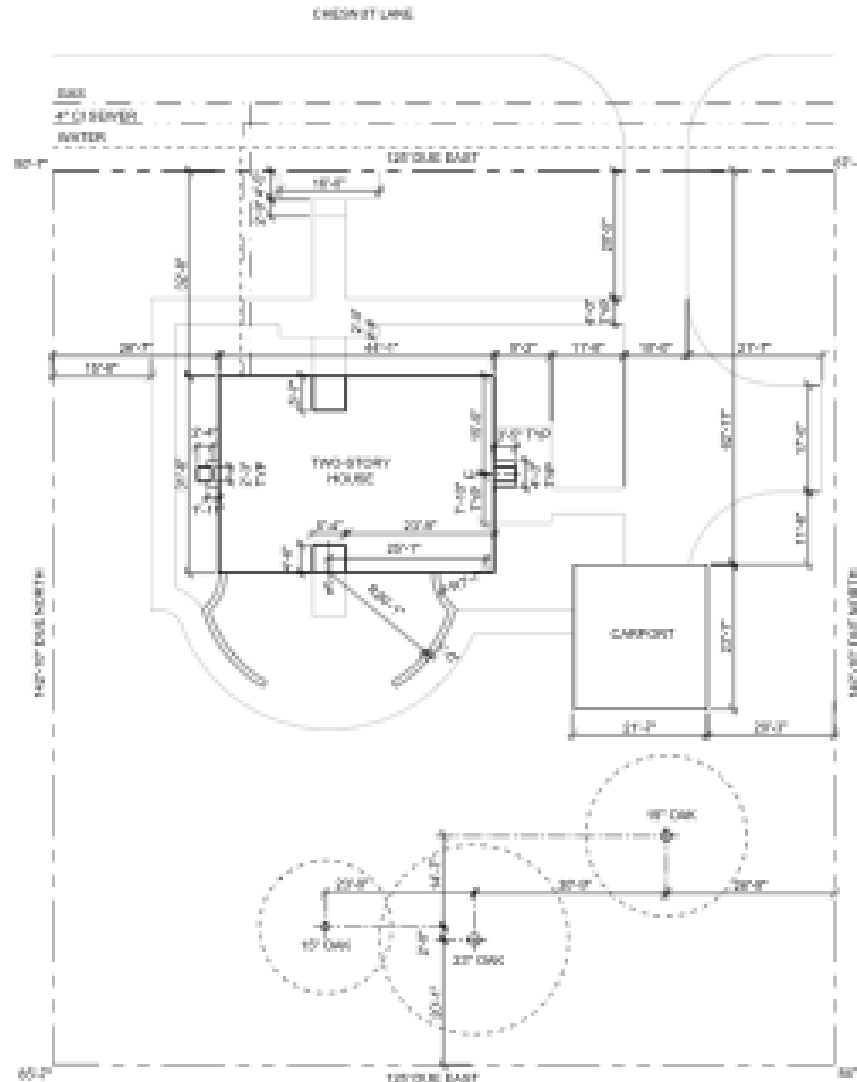
**Look at the 1/4" scale and read from right to left.
The lower numbers represent feet.**



SCALE IN CONSTRUCTION DRAWINGS:

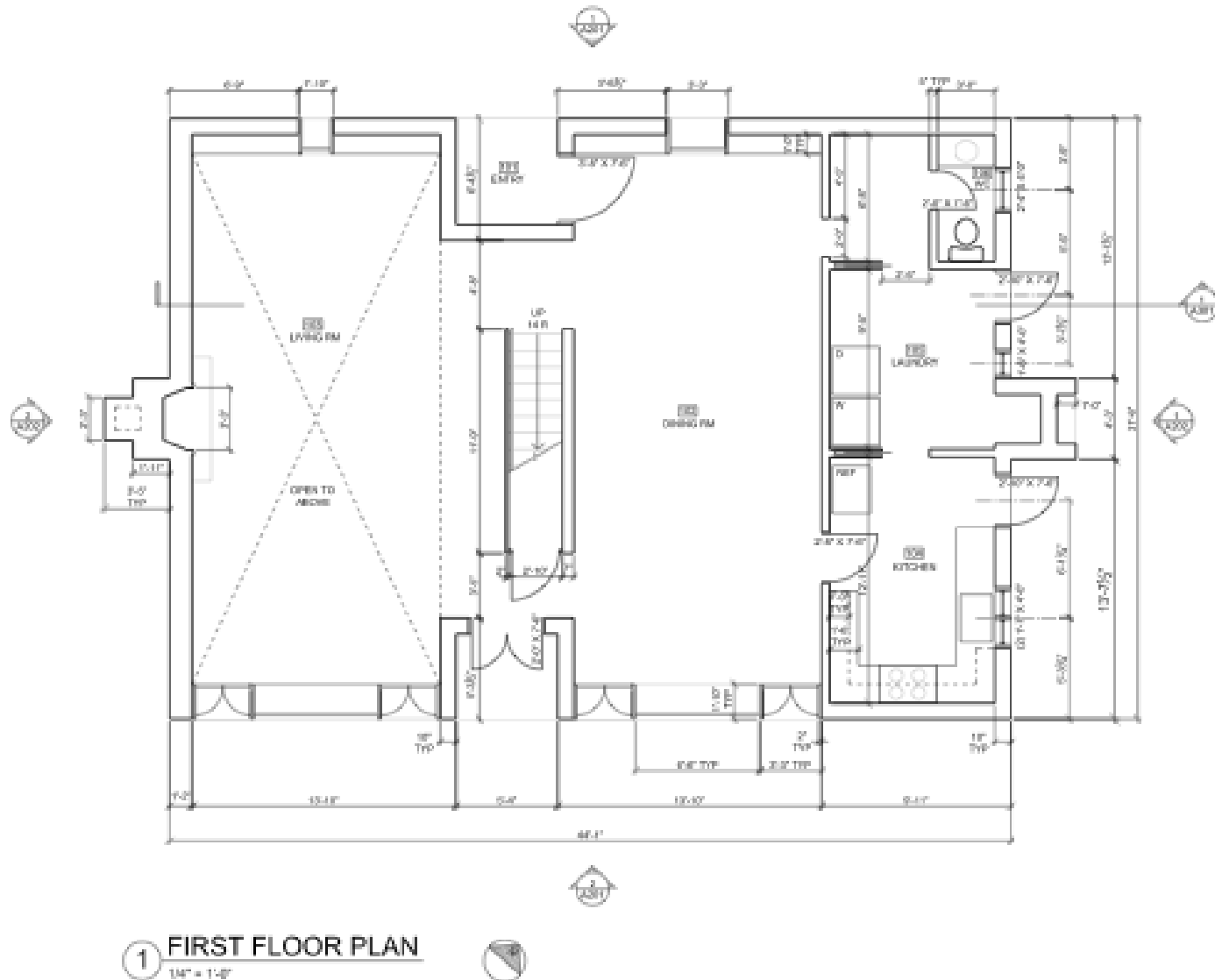
Site Plan: 1/32" - 1/16"=1'-0"

We start at a small scale to look at the project and site as a whole.



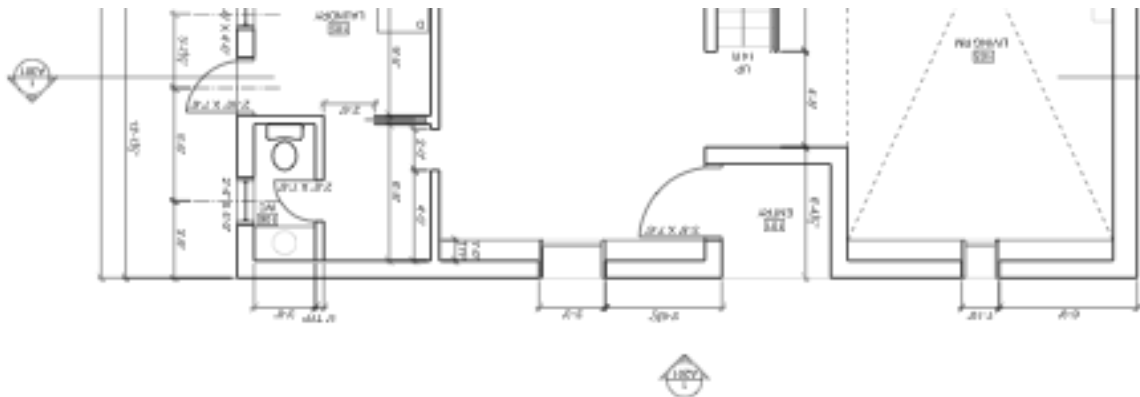
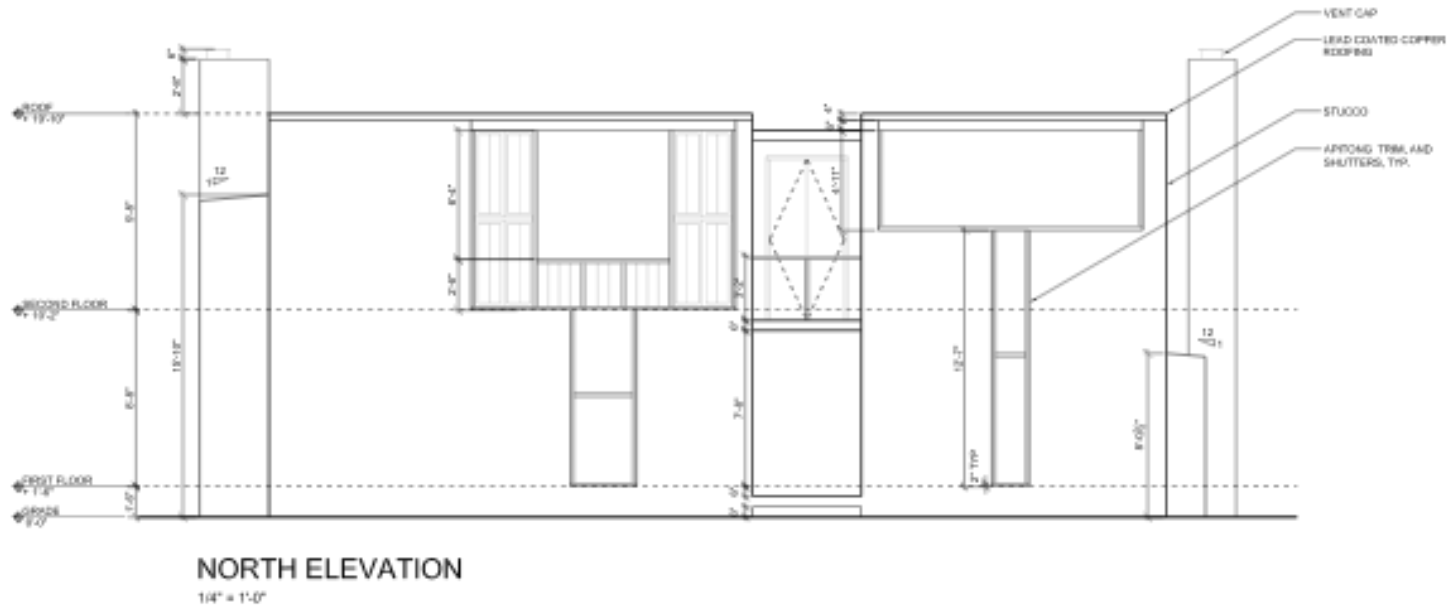
Floor Plans: 1/8"=1'-0" - 1/4" = 1'-0"

We shift to a larger scale to show general details in the plans.



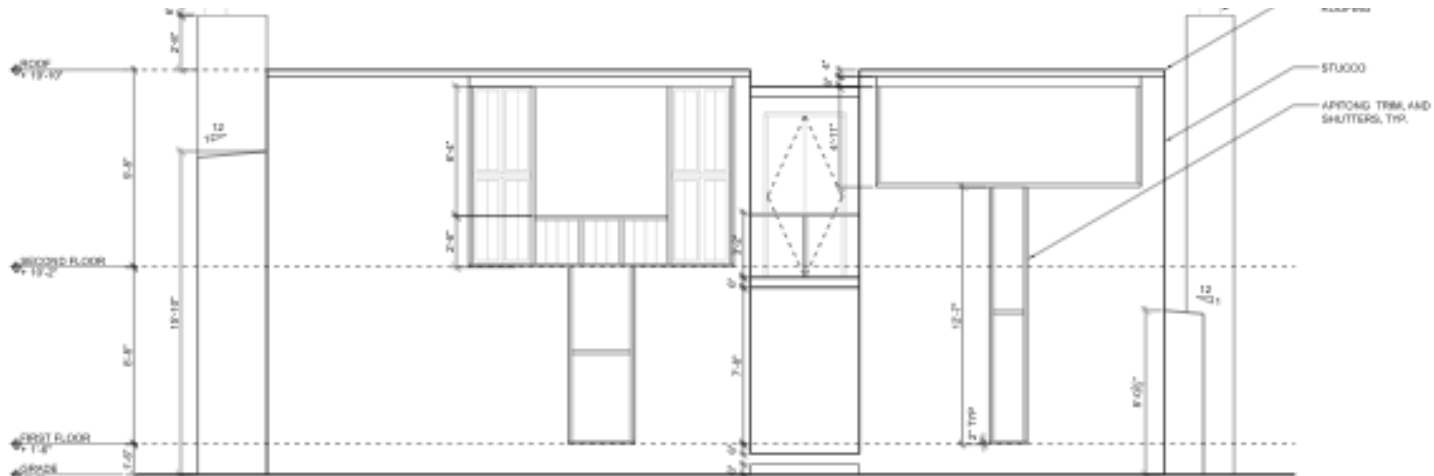
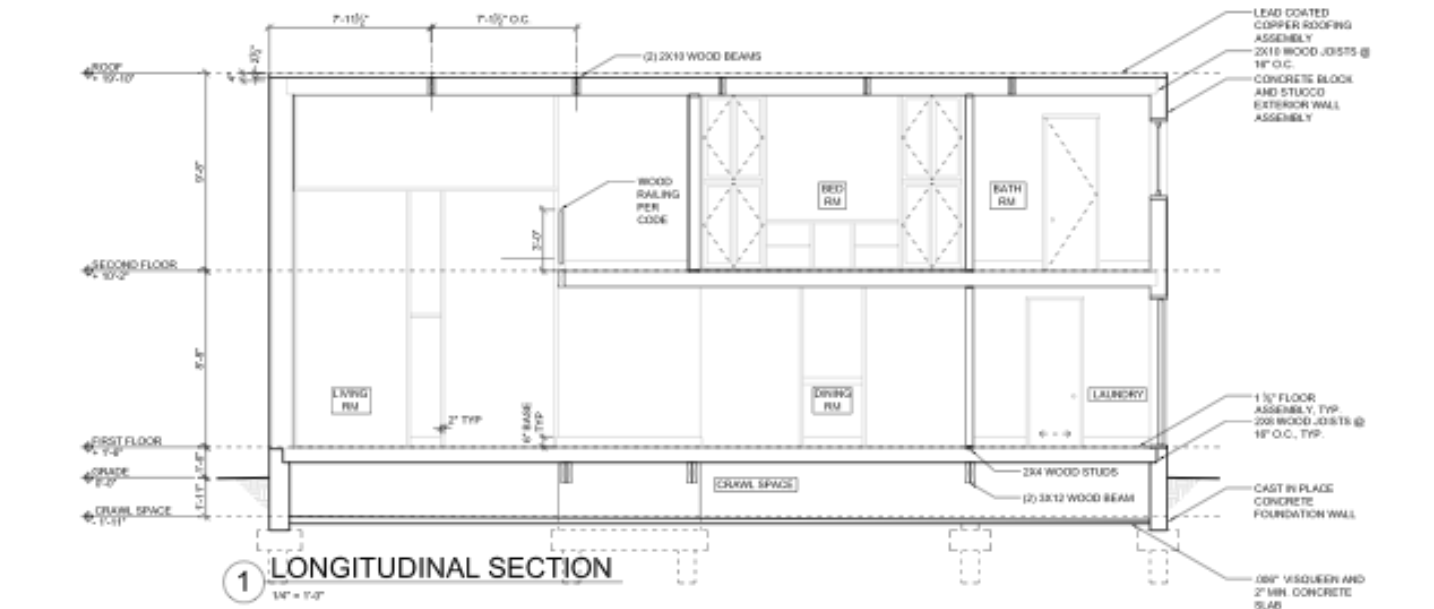
Elevations: $1/8''=1'-0''$ - $1/4''=1'-0''$

Exterior Elevations have the same scale as floor plans for clear understanding of the relationship between the views.



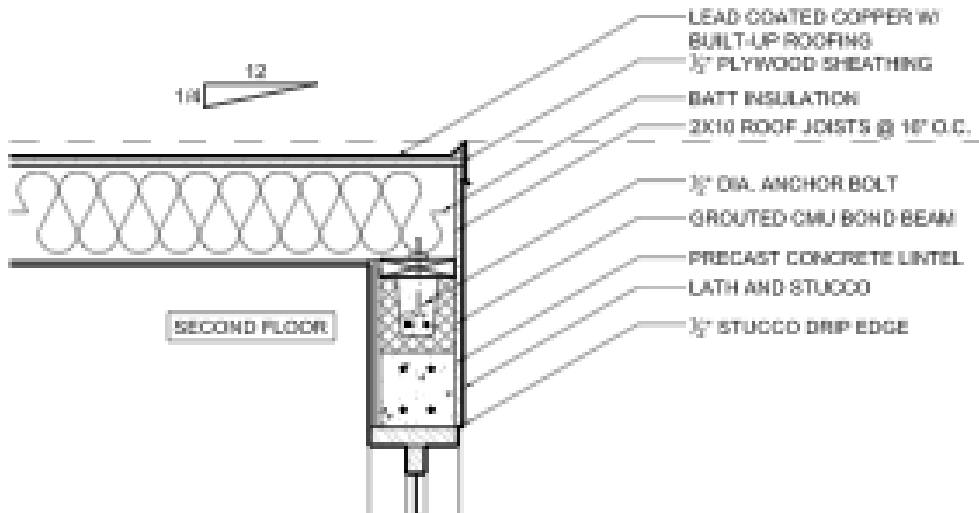
Building Sections: 1/8"=1'-0" - 1/4" = 1'-0"

Overall Building Sections have the same scale as floor plans and elevations for clear understanding of the relationship between views.

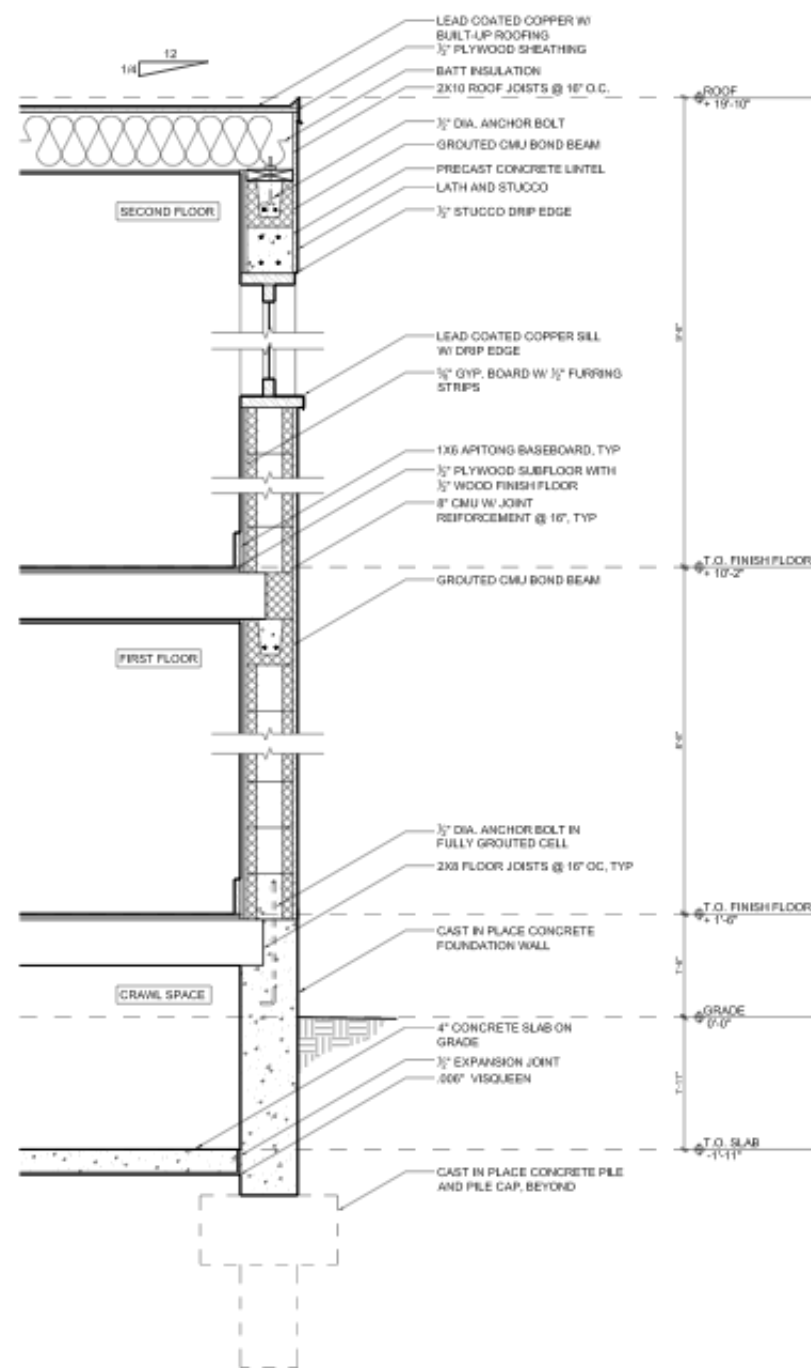


Details: 1" = 1'-0" – 1:1 (Full Scale)

We shift to a larger scale to show a detailed view of a specific condition for the project i.e. construction details. The scale is adjusted for legibility to show a greater level of detail, typically to 3" = 1'-0" or even 1:1.



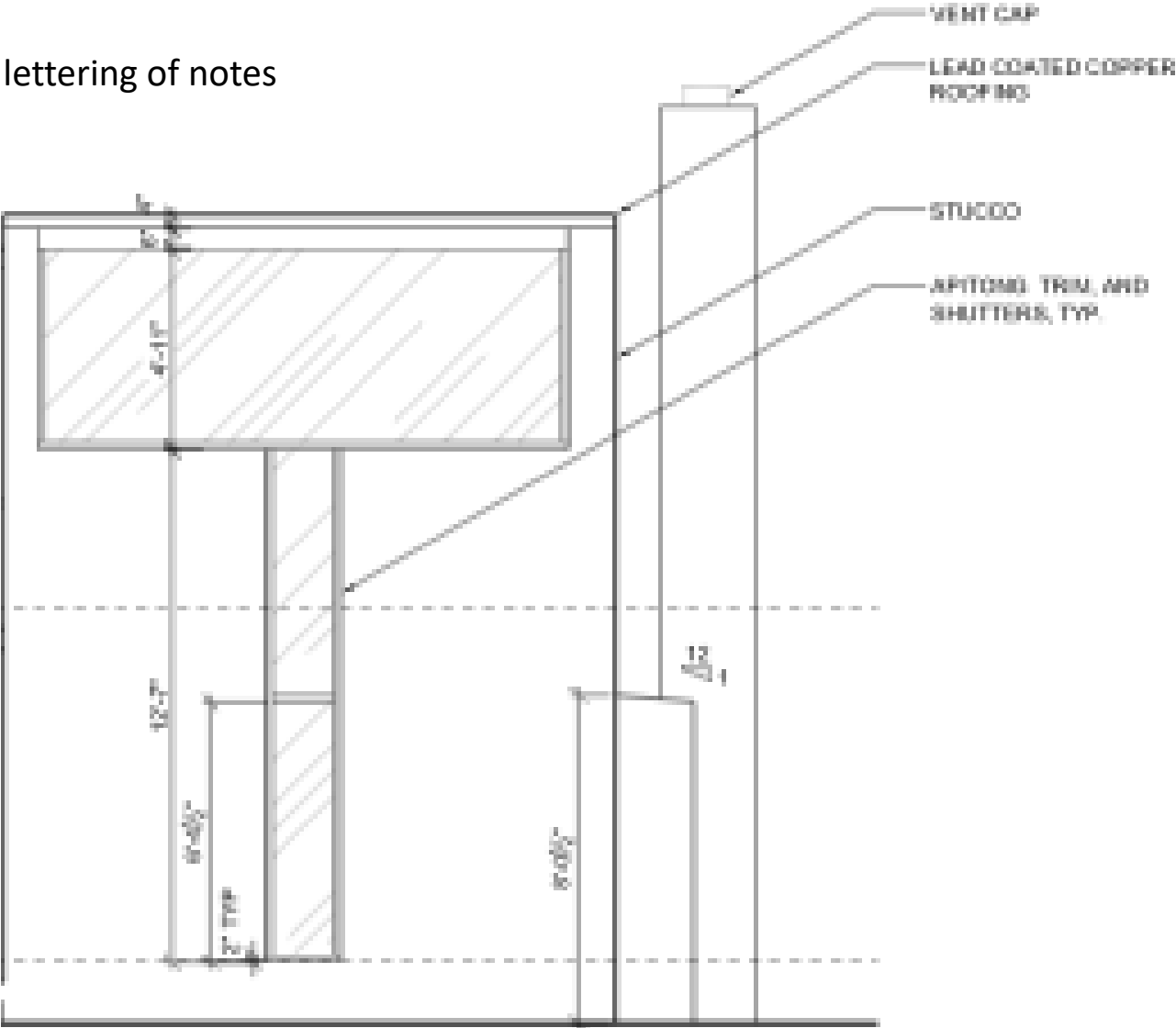
ROOF DETAIL
3" = 1'-0"



WALL SECTION @ STUCCO, TYP.

Note Guidelines:

- 1. Use arrow to identify feature, touching
- 2. Use guidelines to align all leader bends and stops
- 3. Angle of leader to be uniform throughout the drawing
- 4. Use guidelines for lettering of notes



Dimensioning Guidelines:

1. Make dimensions easy to read. Keep the reader's needs in mind

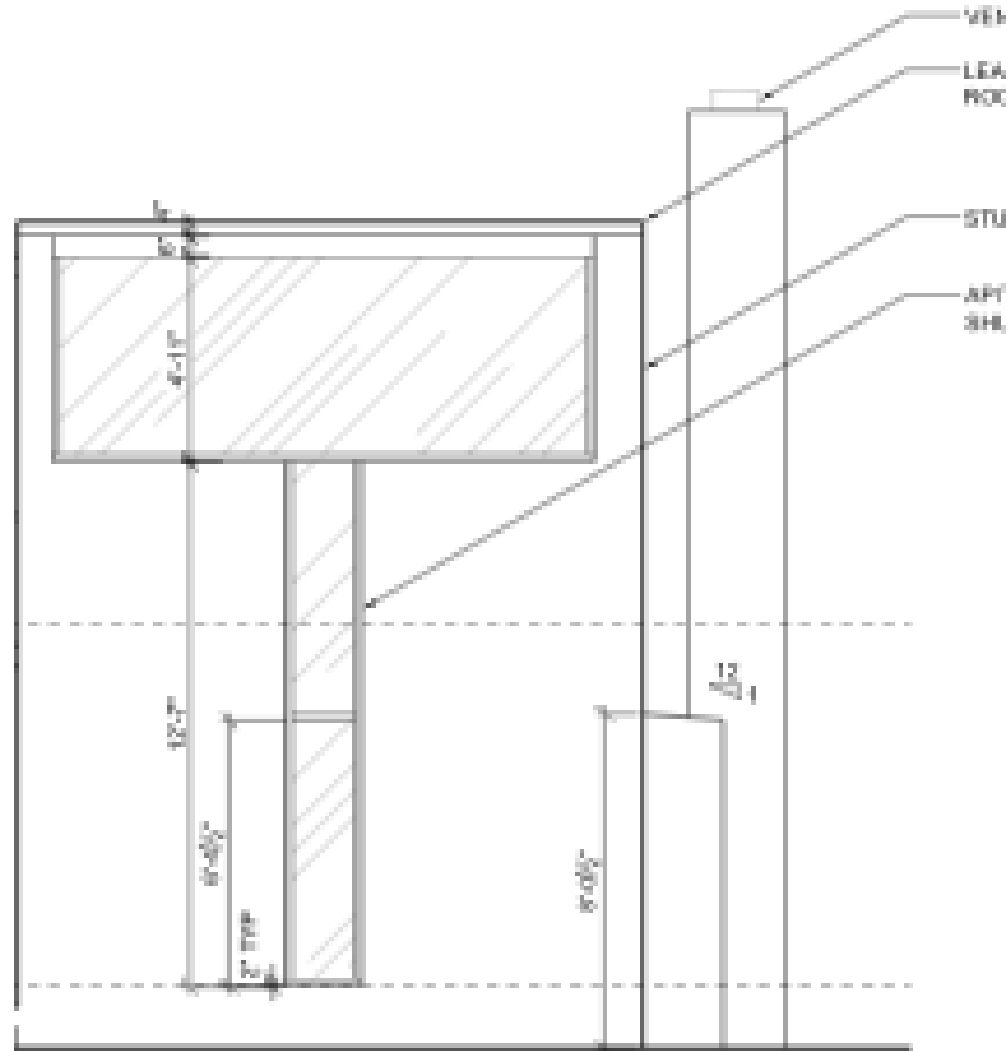
Extension Lines: thin lines drawn from a feature requiring a dimension, but do not touch the feature

- Begin extension line ($\frac{1}{2}$ text height) away from the feature
- Extend beyond dimension line (text height)

Dimension Lines: thin lines with arrow or tick at each end indicating exact extremities of the feature

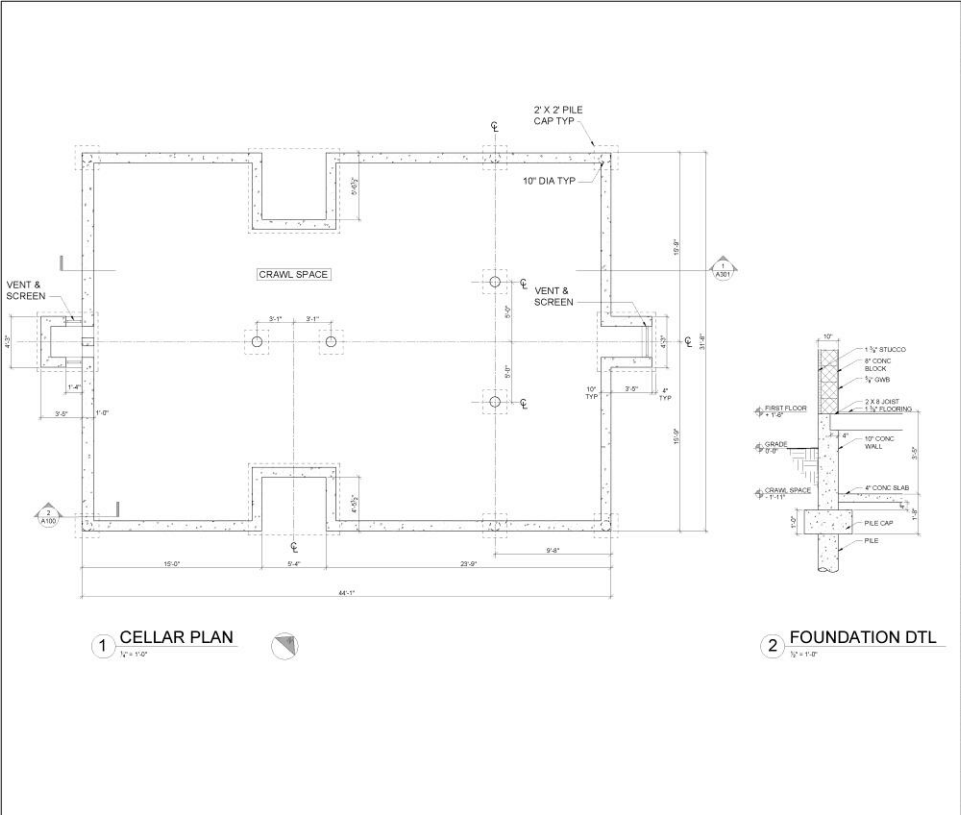
- Numerical dimension is centered above ($\frac{1}{2}$ text height) the dimension line
- Place dimensions for obvious association with their features, typically outside the view

2. Line up dimensions in a series
3. Do not duplicate dimensions



PROCESS:

1. Draw Cellar Plan, Scale 1/4"=1'-0" (See attached)
2. Draw a Typical Pile Cap Detail, Scale 1/2"=1'-0"



ESHERICK HOUSE
 204 SUNRISE LANE
 PHILADELPHIA, PA 19118
 LOUIS KAHN, 1961

NOTES:

NEW YORK CITY COLLEGE OF TECHNOLOGY

DRAWN BY:
 YOUR NAME

DATE:

SCALE: AS NOTED

CELLAR PLAN & DETAIL

A-100

PROCESS:

Cellar Plan @ $\frac{1}{4}'' = 1'-0''$

1.Regulating Lines

- a) Overall Dimensions
- b) Structural Lines

2.Building Elements

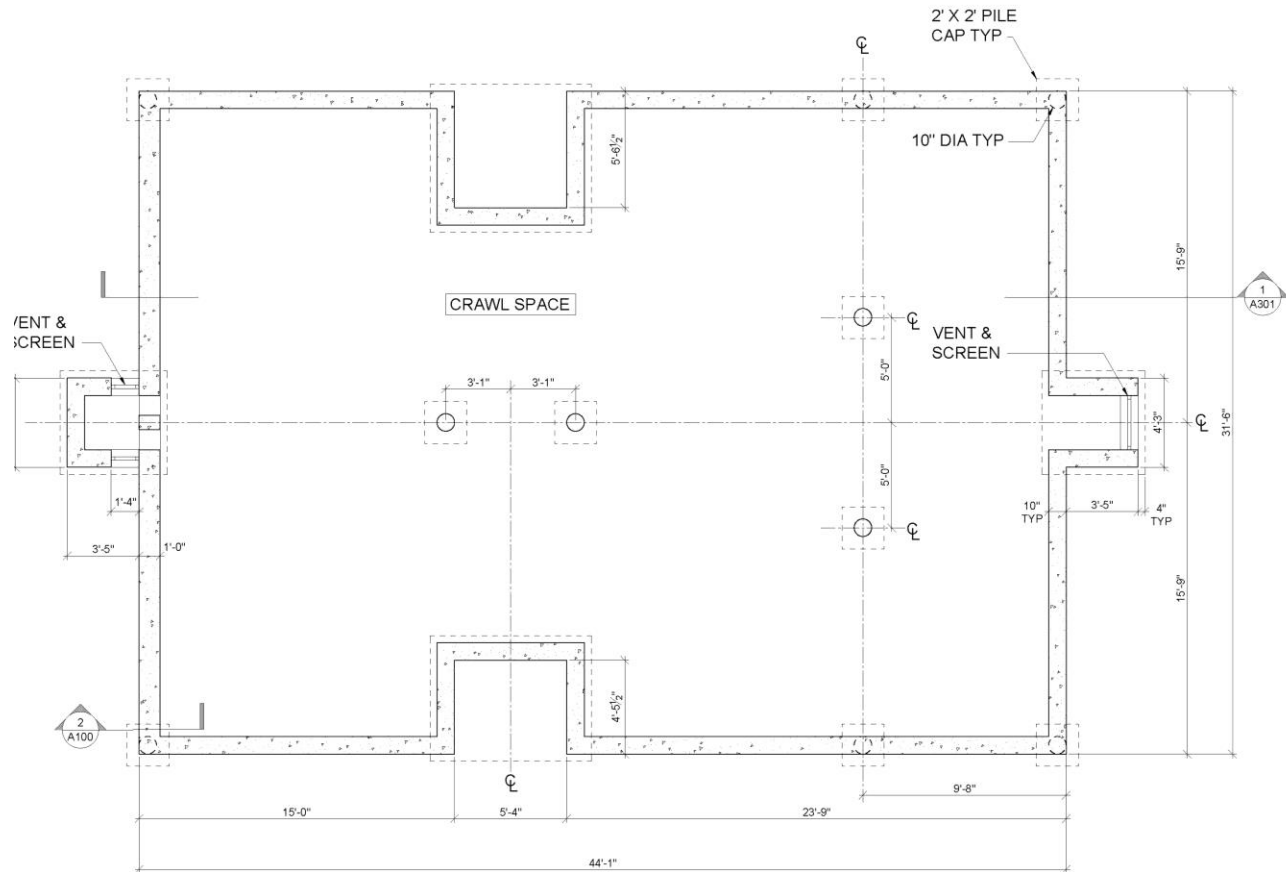
- a) Exterior wall
- b) Columns
- c) Pile Caps
- d) Foundations
- e) Vent and screen

3.Annotation

- a) Symbols
- b) Dimensions
- c) Notes

4.Sheet

- a) Titles
- b) Titleblock



1 CELLAR PLAN
 $\frac{1}{4}'' = 1'-0''$



PROCESS:

Foundation Dtl @ $\frac{1}{2}'' = 1'-0''$

1.Regulating Lines

- a) Building Control Lines (elevation markers)
- b) Overall Dimensions
- c) Structural Lines

2.Building Elements

- a) Foundations
- b) Slab on grade
- c) Floor assembly
- d) Exterior wall assembly
- e) Exterior grade

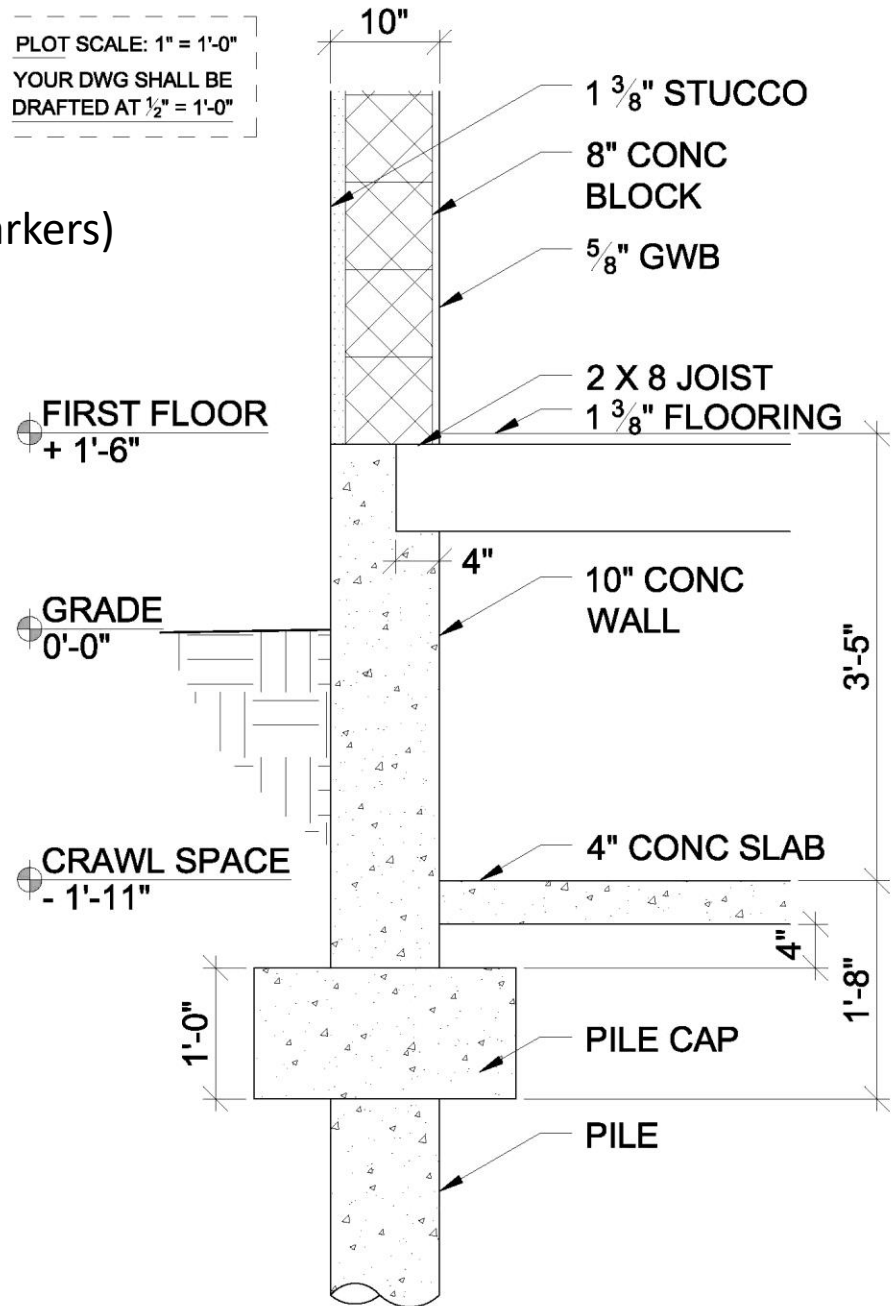
3.Annotation

- a) Symbols
- b) Dimensions
- c) Notes

4.Sheet

- a) Titles
- b) Titleblock

PLOT SCALE: 1" = 1'-0"
YOUR DWG SHALL BE
DRAFTED AT $\frac{1}{2}'' = 1'-0''$

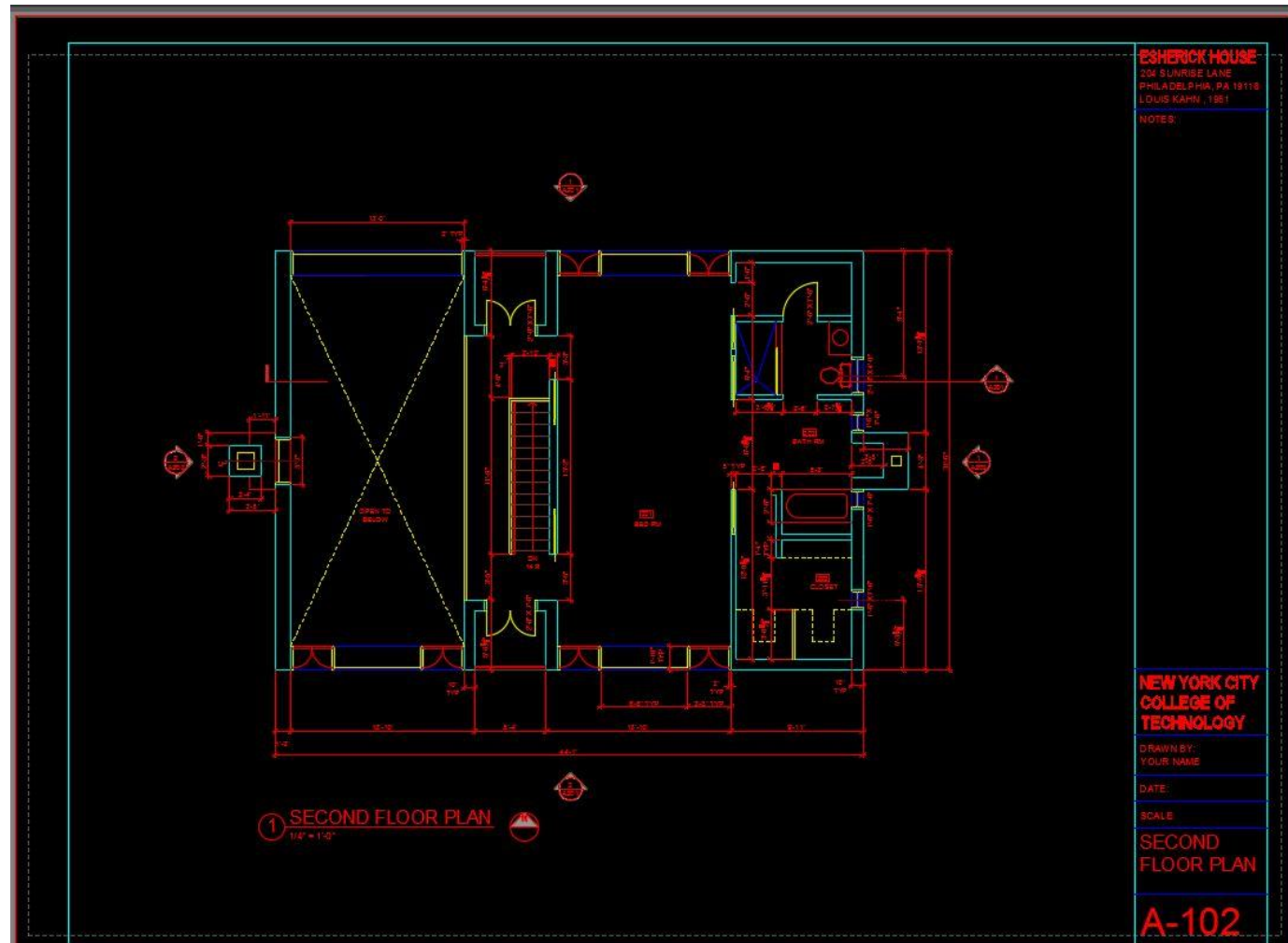


Autocad Techniques

Tools we have learned:

- Copy/Paste
- Ortho Mode and Polar Tracking
- Object Snap
- Construction Line
- Paper Space vs Model Space

- Offset
- Extend/Trim
- Layers and Color Styles
- Line-types
- Text Styles
- Viewports



Trim/Extend

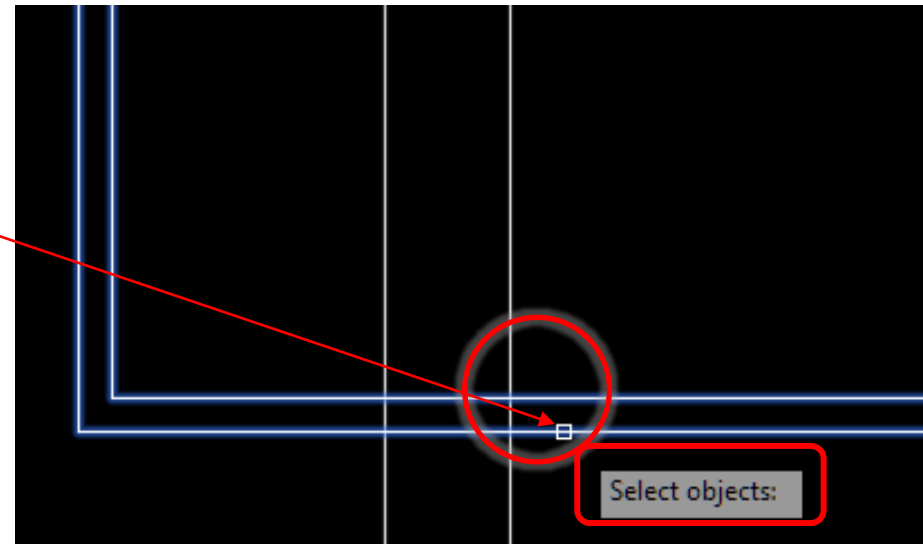
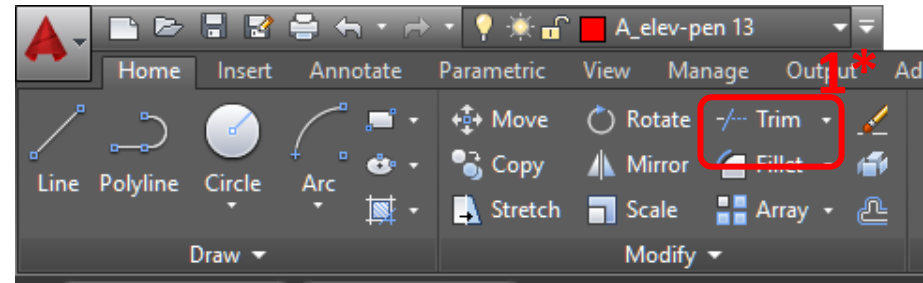
Trim objects to meet the edges of other objects.

Resources: [Autodesk / Trim Command](#)

1. Trim tool used to trim edges of lines (Shortcut “tr”)

***down arrow for extend command**

2. Select trim edges



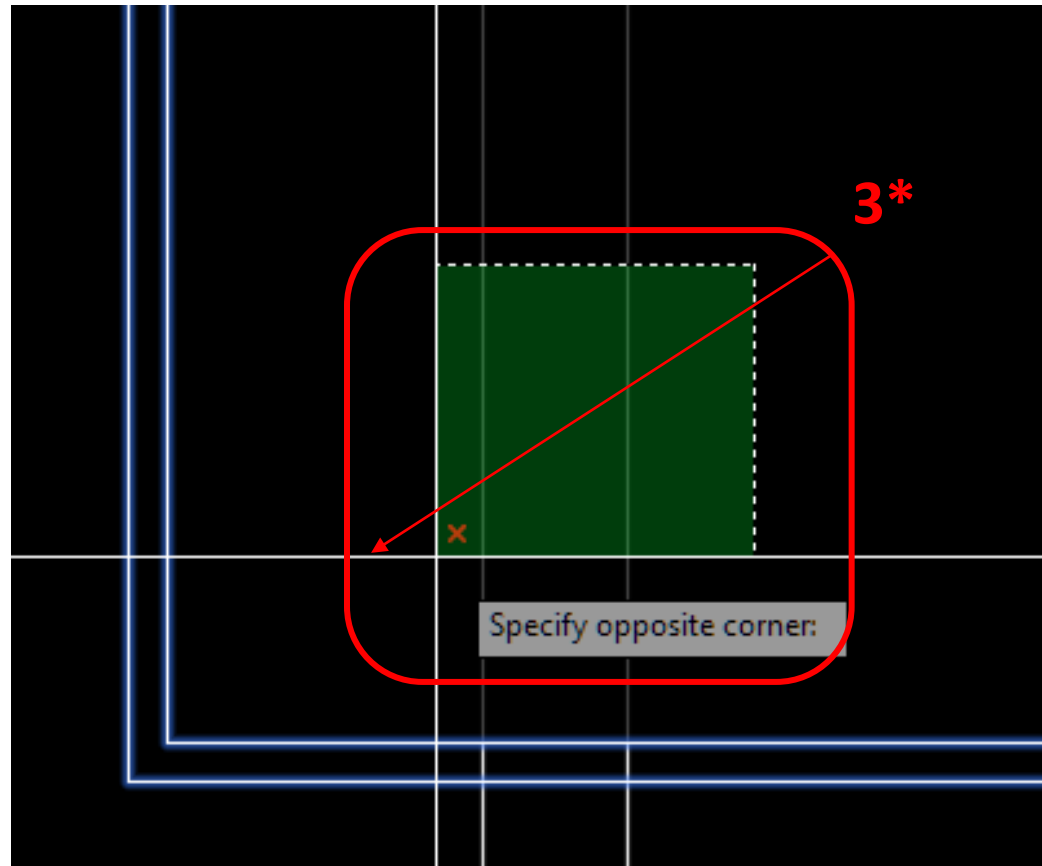
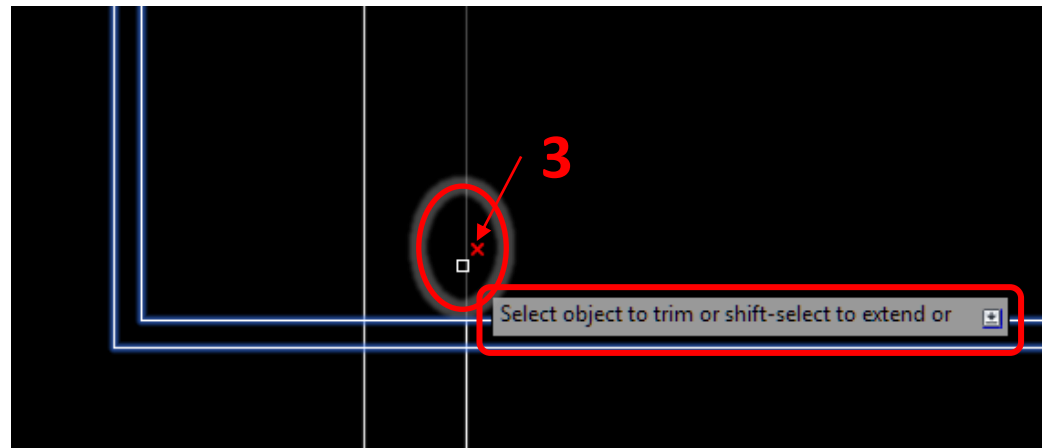
Trim/Extend

3. Select object to trim

3*click in upper right corner, then click in lower left corner of trim area to trim multiple objects

4. Press Enter

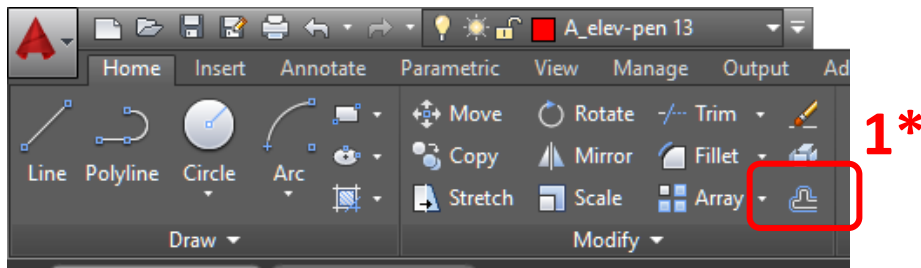
Note: Line to be trimmed is greyed out when mouse is placed over it as a preview



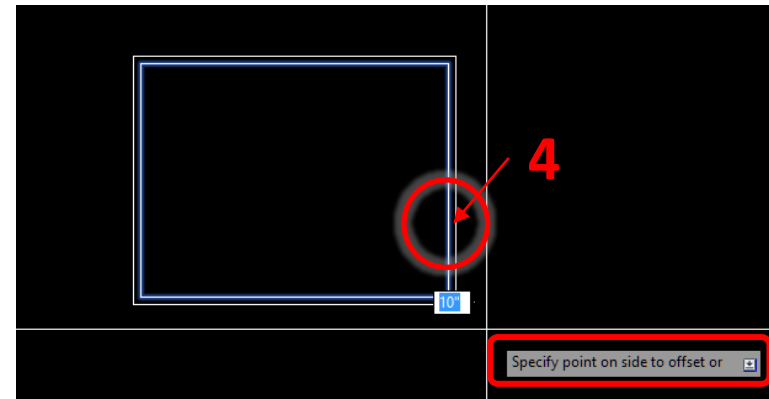
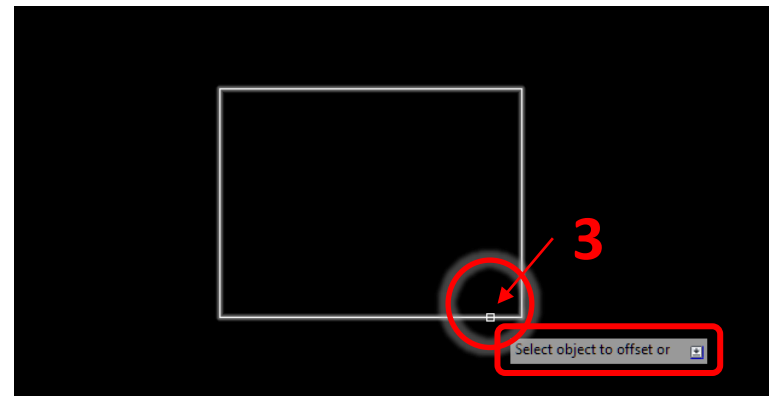
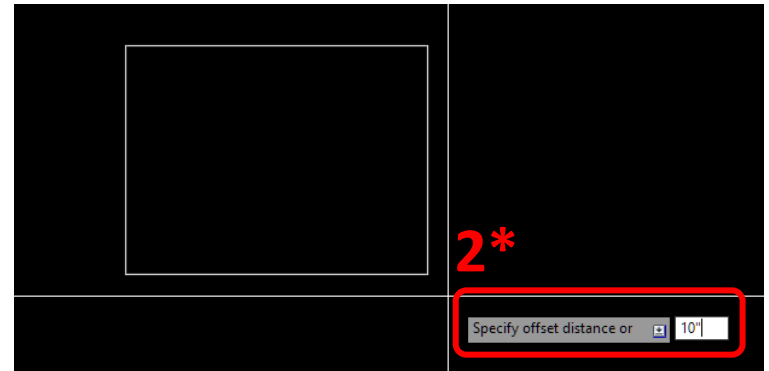
Offset

Offset creates concentric circles, parallel lines and parallel curves at a specified distance from the original.

Resources: [Autodesk / To Offset and Oject](#)



1. Select the offset tool
***or type "o"**



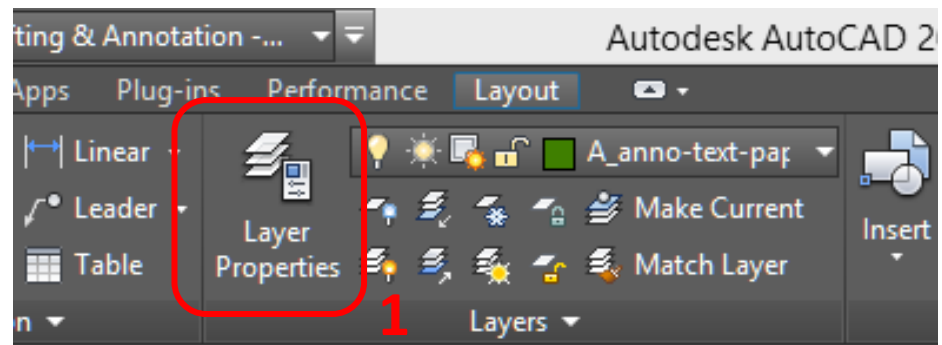
Layers

A **layer** is a virtual piece of paper on which objects/linework is placed. All layers are visible on top of each other... think of it as layers of vellum overlays. This helps in organizing your drawing and keep various elements separate from one another.

- Layers are given a standard name and color
- Layers can be turned on/off, freeze/thaw (visible/not visible), locked, re-ordered (above/behind other layers), matched...
- The **defpoints** layer does not print and is useful as guidelines

Resources: [Autodesk Layer Guide](#)

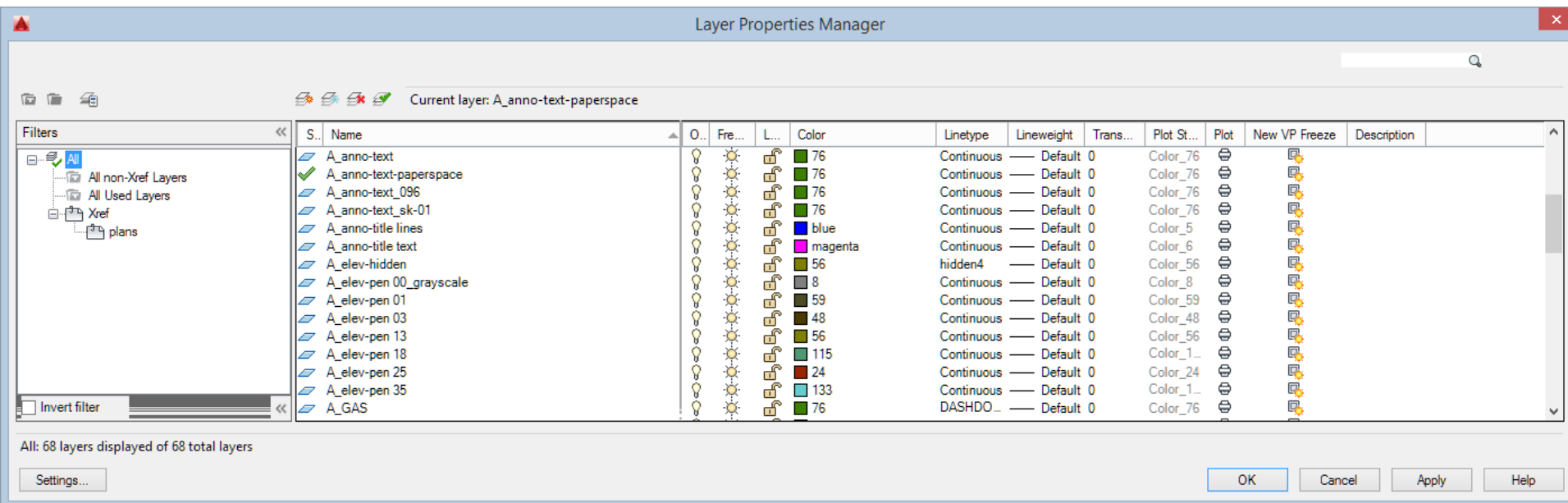
To create a new layer:
1. Select “Layer Properties”
Manager



Layer Properties Manager

Allows you to create new layers and modify layer properties.

- Create new layers, delete layers
- Rename layers
- Layers can be turned on/off using lightbulb
- Linetypes can be assigned to a layer
- Color can be assigned to a layer to identify line weight



Layer Names

Follow standard *layer name* formatting.

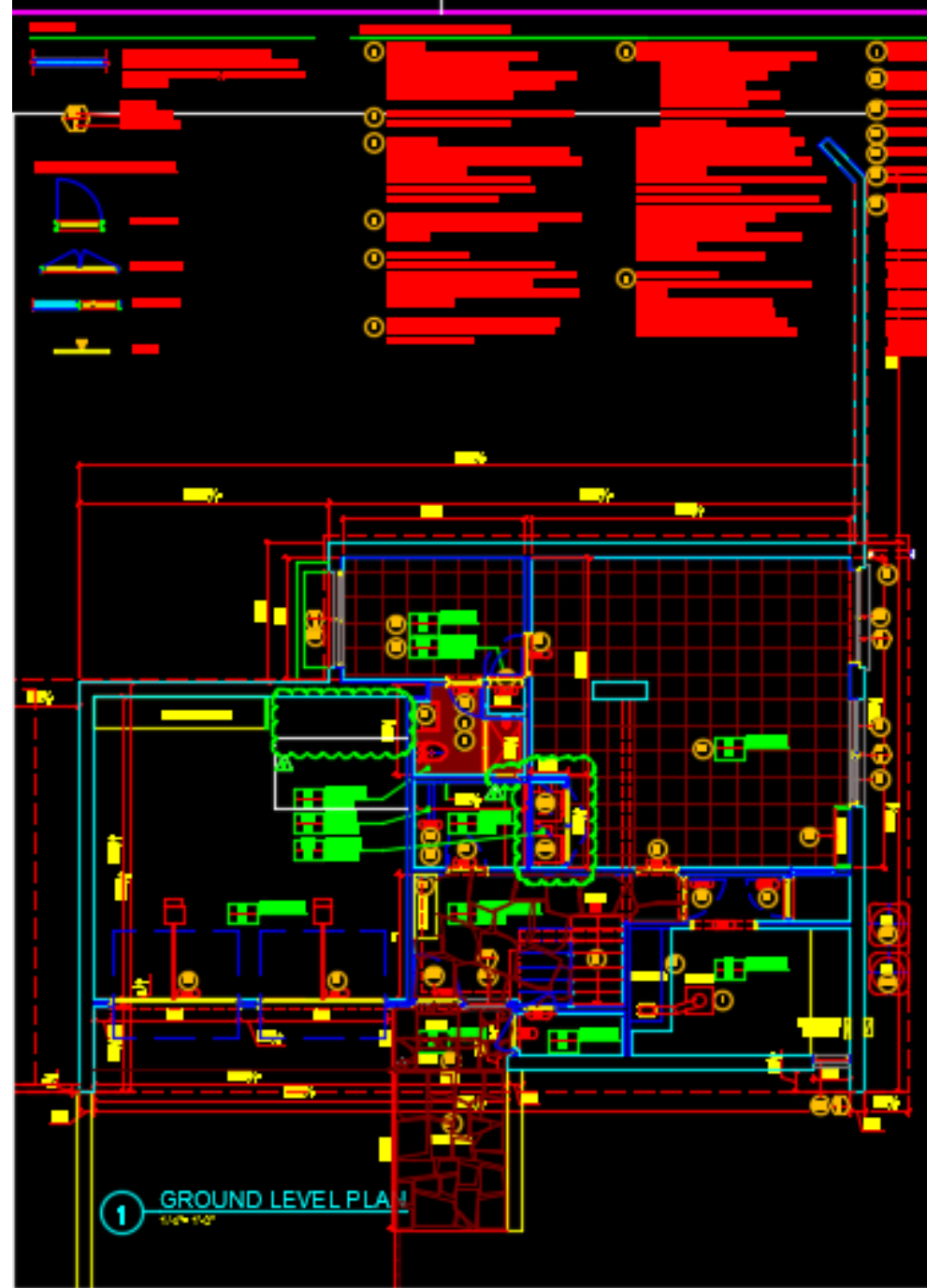
Layer Name Formatting									
# 1	A-WALL	=	Discipline Code	+	Major Group				
# 2	A-WALL-FULL	=	Discipline Code	+	Major Group	+	Minor Group		
# 3	A-WALL-DEMO	=	Discipline Code	+	Major Group	+	Status Code		
# 4	A-WALL-FULL-E	=	Discipline Code	+	Major Group	+	Minor Group	+	Status Code

Discipline Designator			
A	Architectural	O	Operations
B	Geotechnical	P	Plumbing
C	Civil	Q	Equipment
D	Process	R	Resource
E	Electrical	S	Structural
F	Fire Protection	T	Telecommunications
G	General	U	University (HU defined)
H	Hazardous Materials	V	Survey/Mapping
I	Interiors	X	Other Disciplines
L	Landscape	Z	Contractor / Shop Drawings
M	Mechanical		

Layer Colors

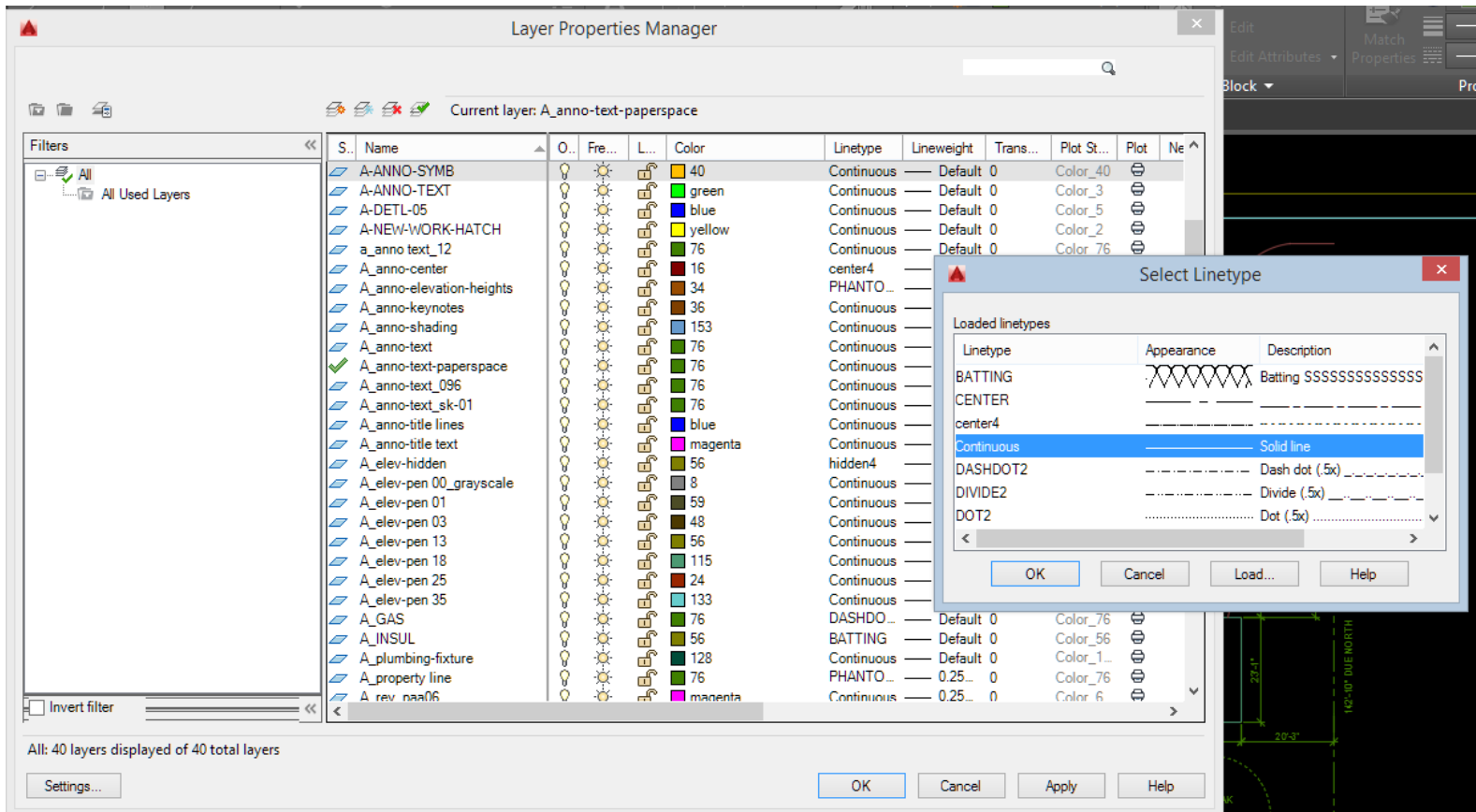
Layers are assigned colors allowing for clear distinction between various elements.

Color can also be used to determine the plotted properties of lines. Colors can be assigned lineweights. *See plot styles.*



Line-types

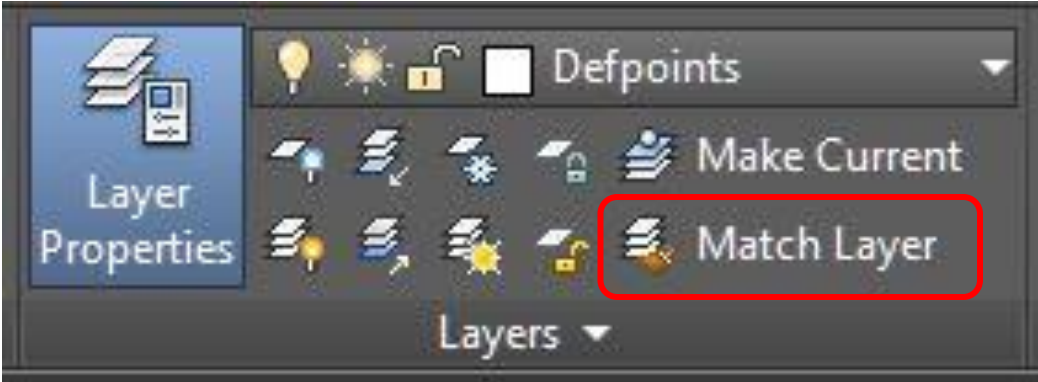
Layers are assigned *line-types*, which function the same as with analog drafting techniques.



Modifying Properties

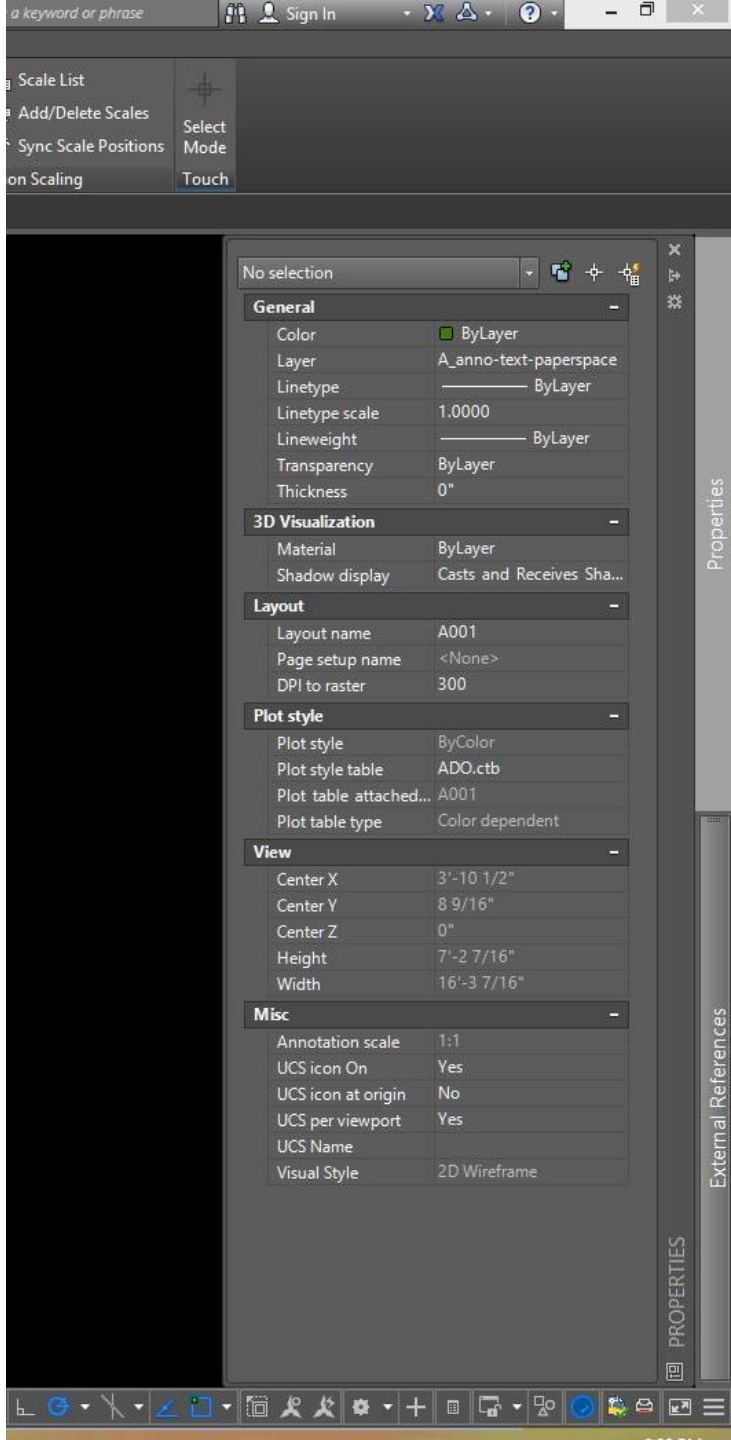
Use the **Layers** Ribbon tab:

- a. Select the object, then select the desired layer in the dropdown menu
- b. Match layer properties, select source layer then the object you want to match



Or

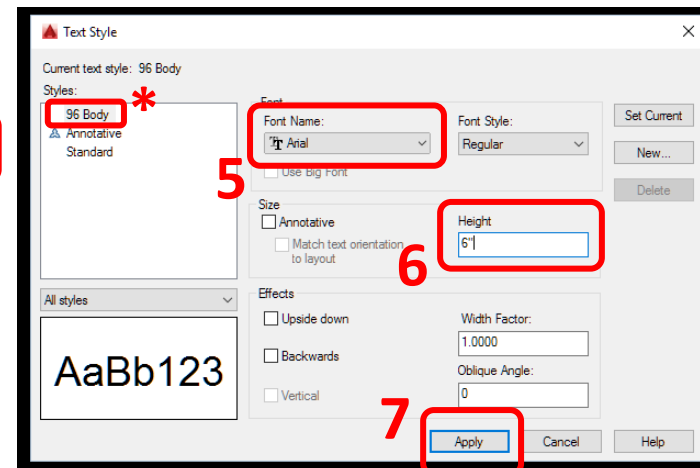
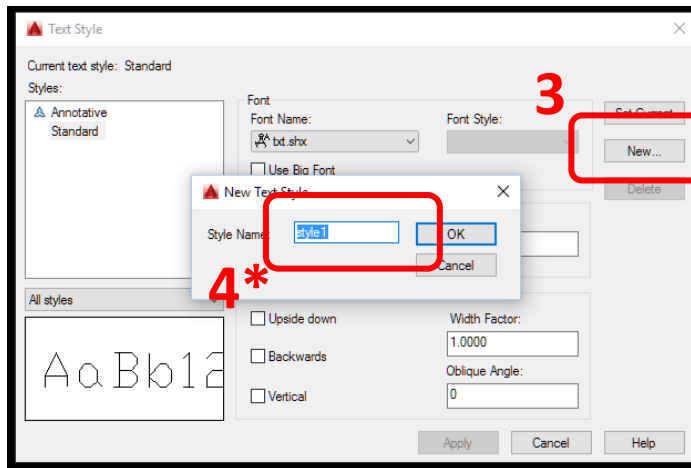
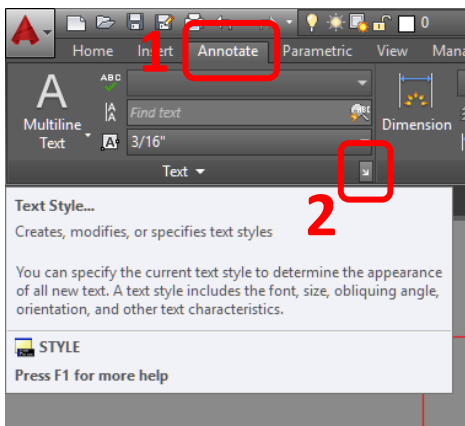
Properties Palette (to open: select an object then right click, then select "properties")



Adding Text Styles

You will need to create a text style for heading (1/4") and body text (1/8") per the associated text scale factor. The text scale factor is based on the scale of the drawing in your viewport.

For example: I draft my floor plan at 1:1 in model space and I want the drawing to print at a scale of 1/4"=1'-0". I will create a text style for body text with height of 6" (Refer to chart).



Adding Text Styles – Scale Factor

What scale
will your
drawing be?

PLOT SCALE	PLOTTED TEXT HEIGHT						
	1/16"	3/32"	1/8"	5/32"	3/16"	7/72"	1/4"
FULL	.0625	.09375	.125	.15625	.1875	.21875	.25
1/16"=1'-0"	12	18	24	30	36	42	48
3/32"=1'-0"	8	12	16	20	24	28	32
1/8"=1'-0"	6	9	12	15	18	21	24
3/16"=1'-0"	4	6	8	10	12	14	16
1/4"=1'-0"	3	4.5	6	7.5	9	10.5	12
3/8"=1'-0"	2	3	4	5	6	7	8
1/2"=1'-0"	1.5	2.25	3	3.75	4.5	5.25	6
3/4"=1'-0"	1	1.5	2	2.5	3	3.5	4
1"=1'-0"	.75	1.125	1.5	1.875	2.25	2.655	3
1-1/2"=1'-0"	.5	.75	1	1.25	1.5	1.75	2
3"=1'-0"	.25	.375	.5	.625	.75	.875	1
1"=10'	7.5	11.25	15	18.75	22.5	26.5	30
1"=20'	15	22.5	30	37.5	45	52.5	60
1"=30'	22.5	33.75	45	56.25	67.5	78.75	90
1"=40'	30	45	60	75	90	105	120
1"=50'	37.5	56.25	75	93.75	112.5	131.25	150
1"=60'	45	68.5	90	112.5	135	157.5	180
1"=100'	75	112.5	150	187.5	225	262.5	300

CELLAR PLAN: Process

1. Draft the objects in MODEL SPACE

- a) Start with guidelines, utilize CAD tools reviewed to date
- b) Complete with proper layers (lineweights and linetypes)

2. Annotation:

- a) Copy symbols and text from template information, apply as required
- b) Add notes and dimensions

3. Drawing Layout in PAPER SPACE

- a) Create a copy of your A000 Tab and rename A-100
- b) Create a viewport and adjust the scale
- c) Center the drawing in the viewport
- d) Add Title/Scale and North Arrow

4. Titleblock

- a) Complete Title, Scale, Date fields etc

5. Review and Submit .DWG file via Dropbox

***** Wall Section is EXTRA CREDIT*****