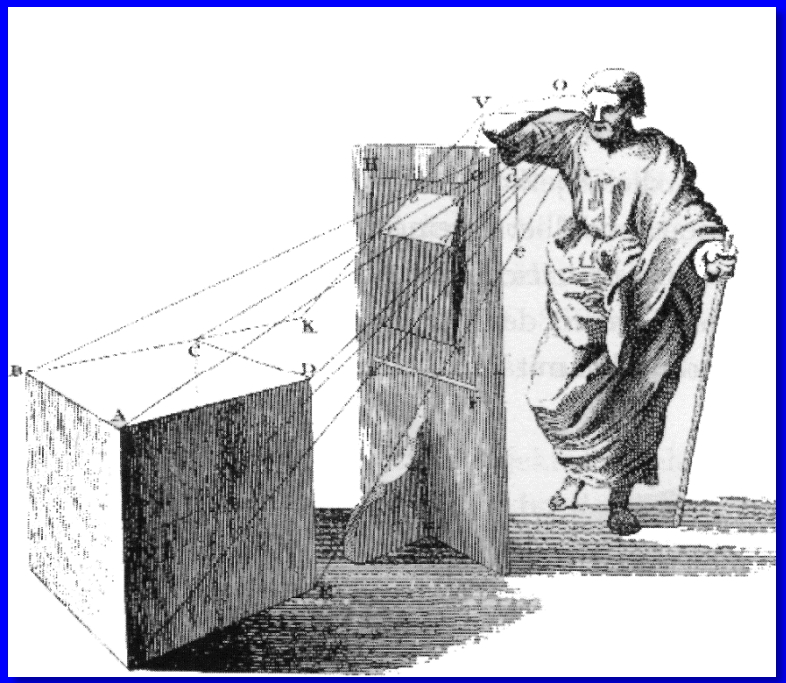


drawings_how_to??

Arch 172: Building Construction 1

Danger!!!

The following images are being used as examples of DRAWING METHOD ONLY.

Do NOT copy the details. They have been drawn from “everywhere” and are likely WRONG for our climate and situation.

triangles

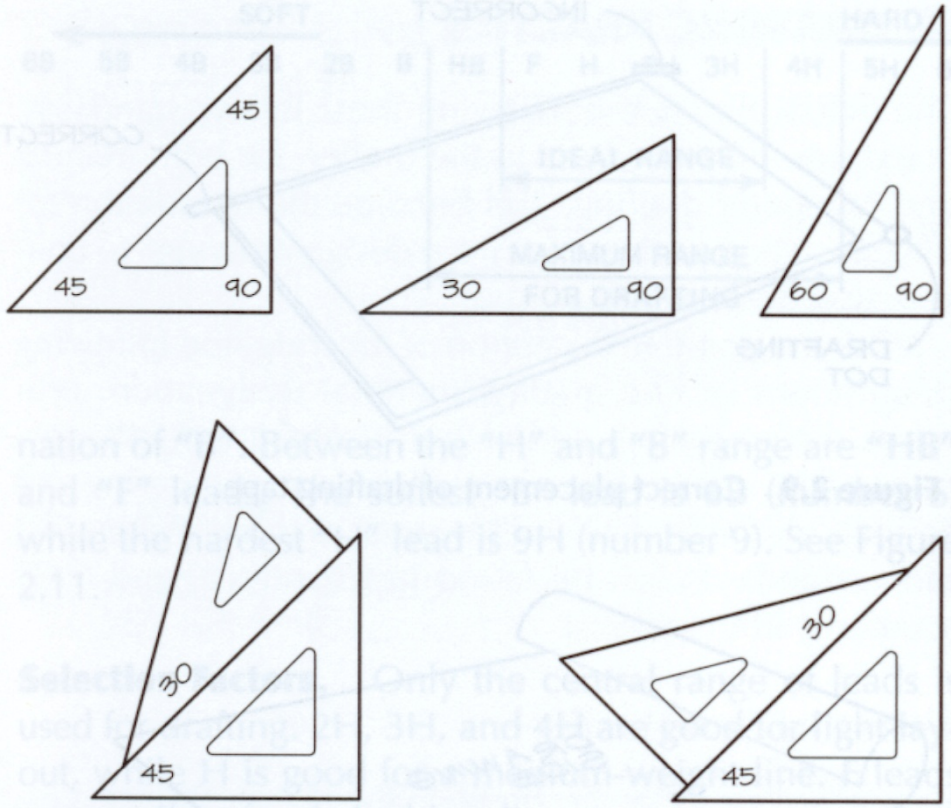
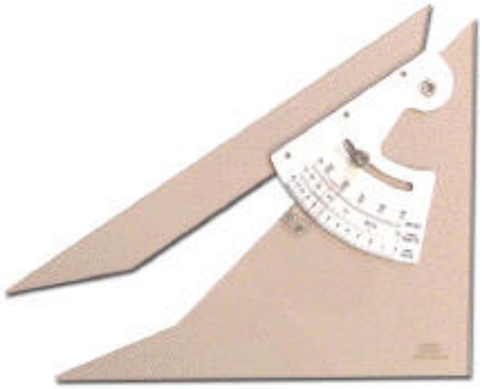


Figure 2.5 Triangles and combinations of triangles.



Adjustable triangle

relationship of drawings

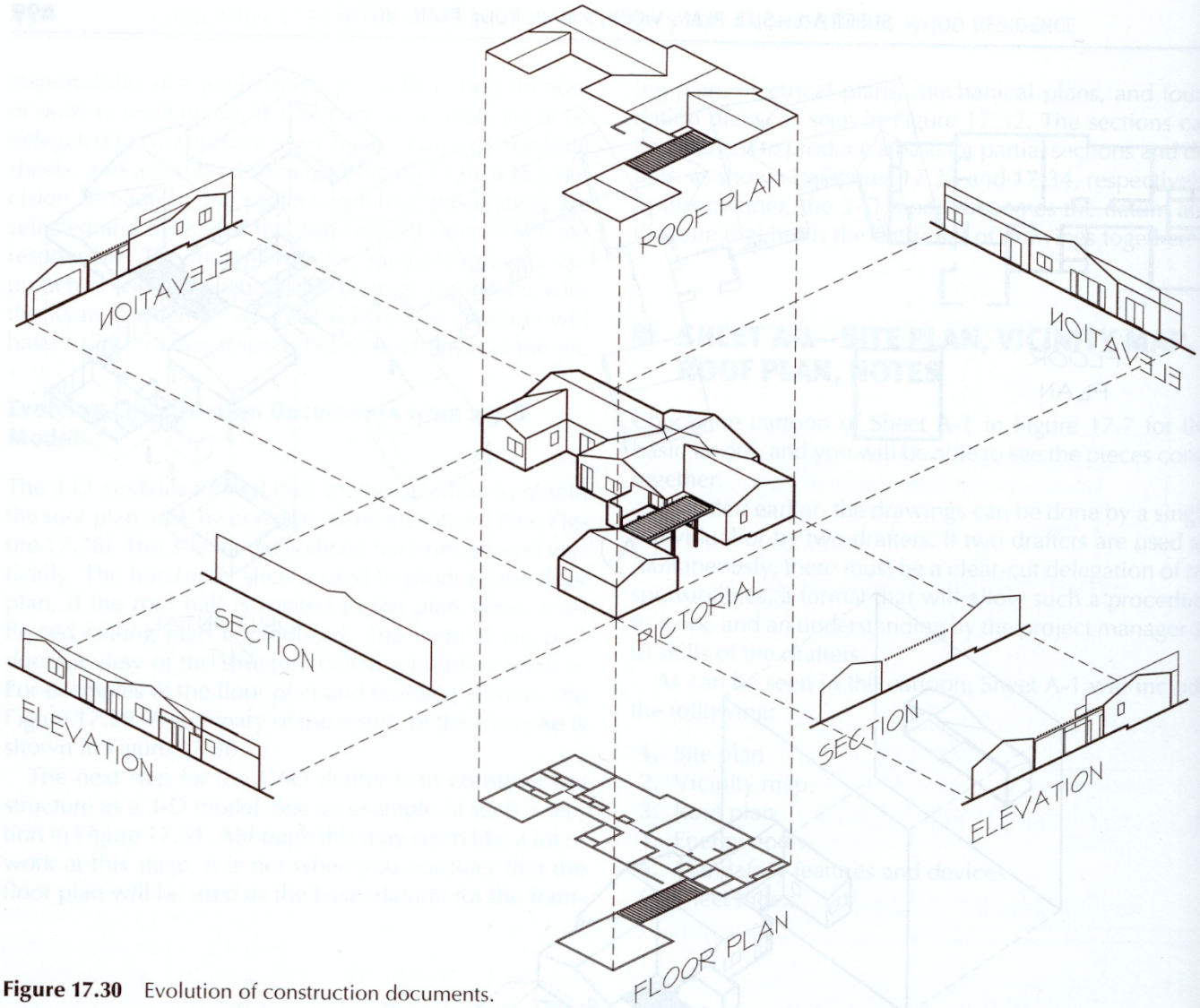


Figure 17.30 Evolution of construction documents.

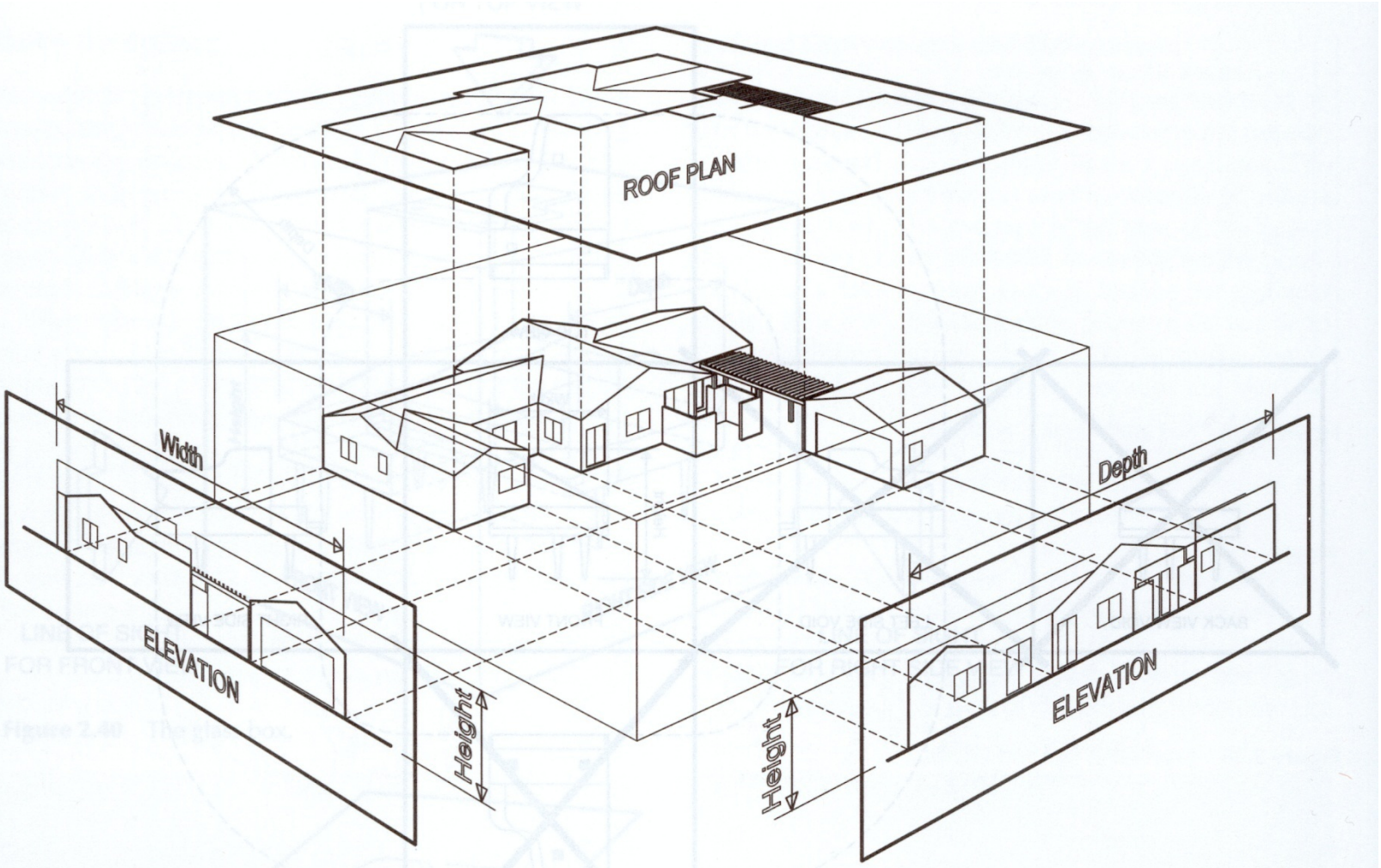
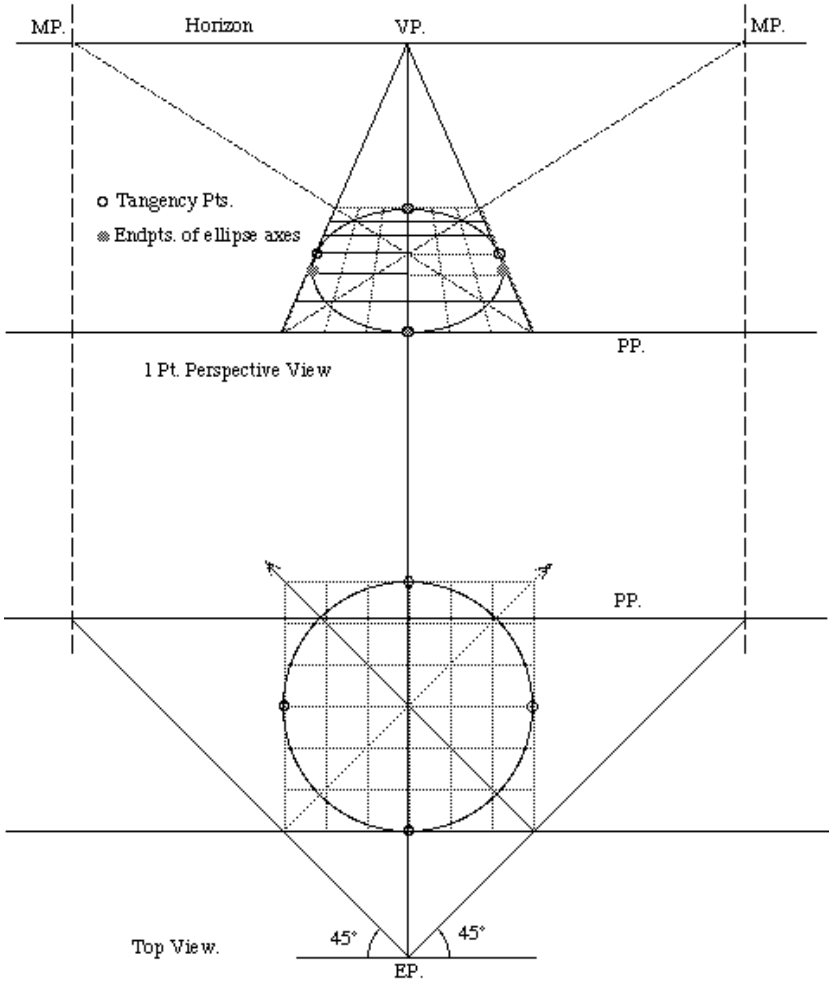
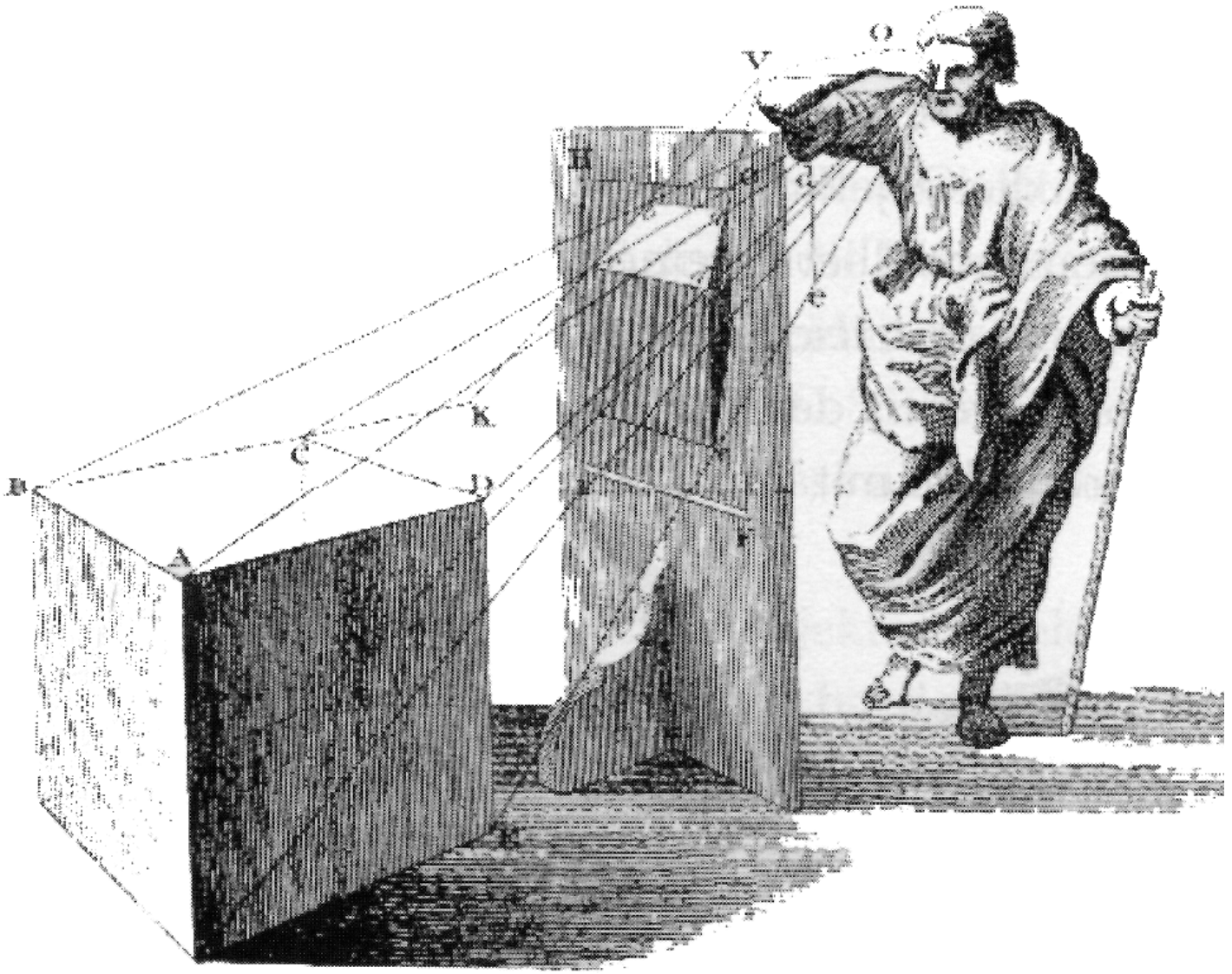


Figure 2.43 A multiview drawing of a structure.

alberti


MP.
Horizon
VP.
MP.
o Tangency Pts.
⊗ Endpts. of ellipse axes
PP.
1 Pt. Perspective View
PP.
Top View.
45°
45°
EP.


V
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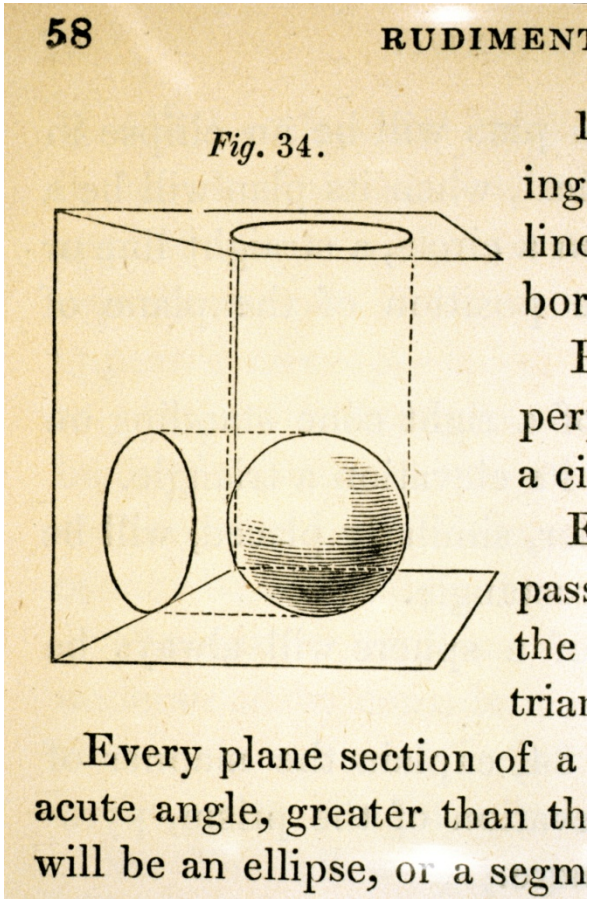
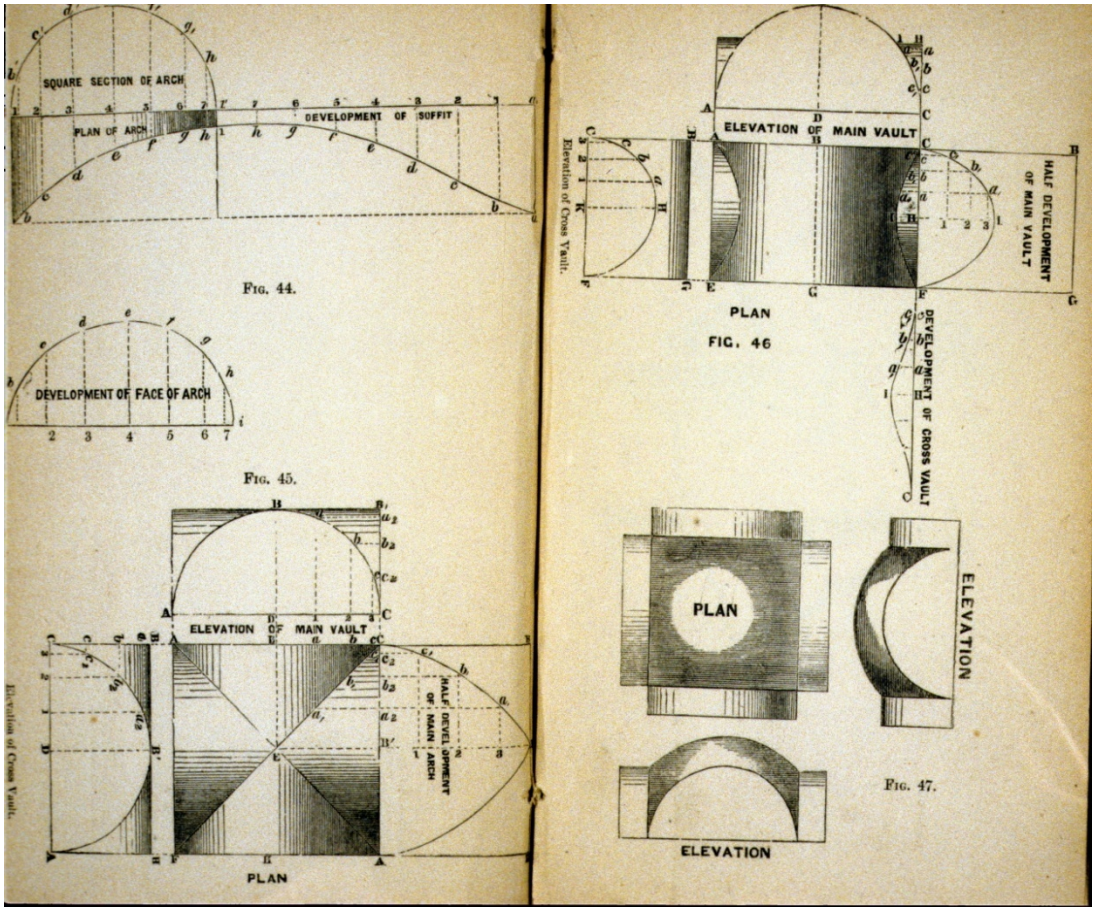
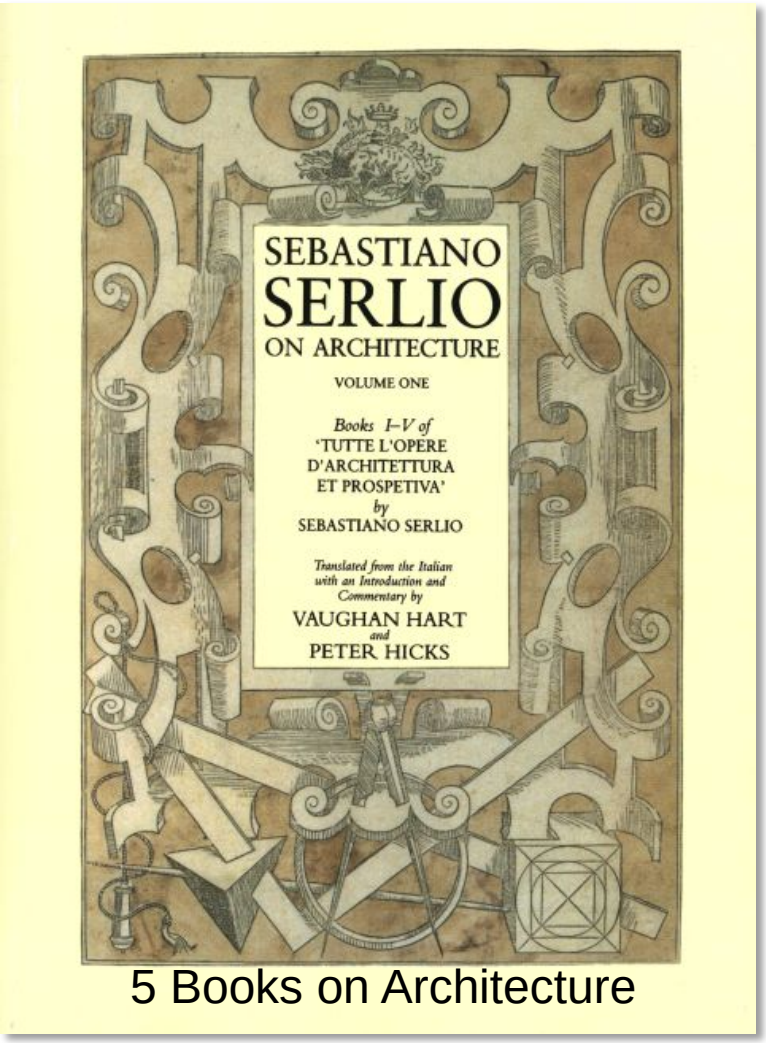
sterometry…

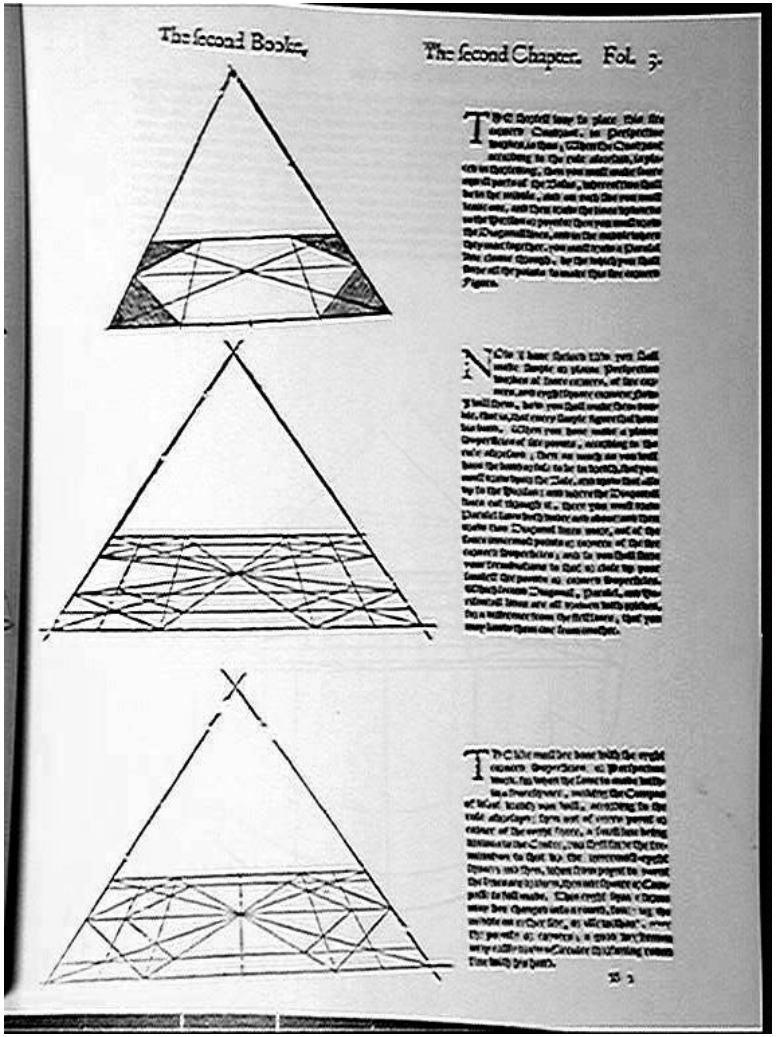

58
RUDIMENT
Fig. 34.
Every plane section of a
acute angle, greater than th
will be an ellipse, or a segm

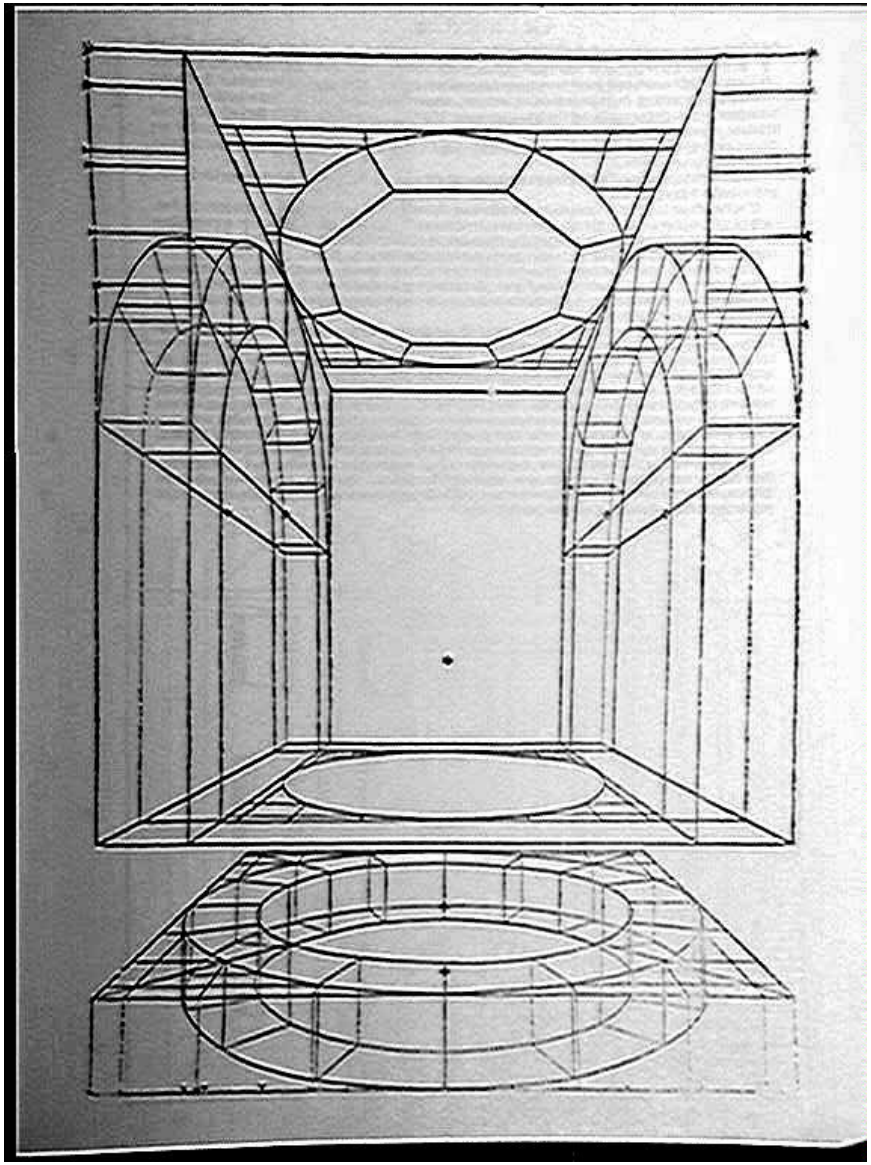

SQUARE SECTION OF ARCH
PLAN OF ARCH
DEVELOPMENT OF SOFFIT
Fig. 44.
DEVELOPMENT OF FACE OF ARCH
Fig. 45.
ELEVATION OF MAIN VAULT
PLAN
HALF DEVELOPMENT OF MAIN ARCH
Elevation of Cross Vault.
ELEVATION OF MAIN VAULT
HALF DEVELOPMENT OF MAIN VAULT
PLAN
FIG. 46
DEVELOPMENT OF CROSS VAULT
PLAN
ELEVATION
Fig. 47.
ELEVATION

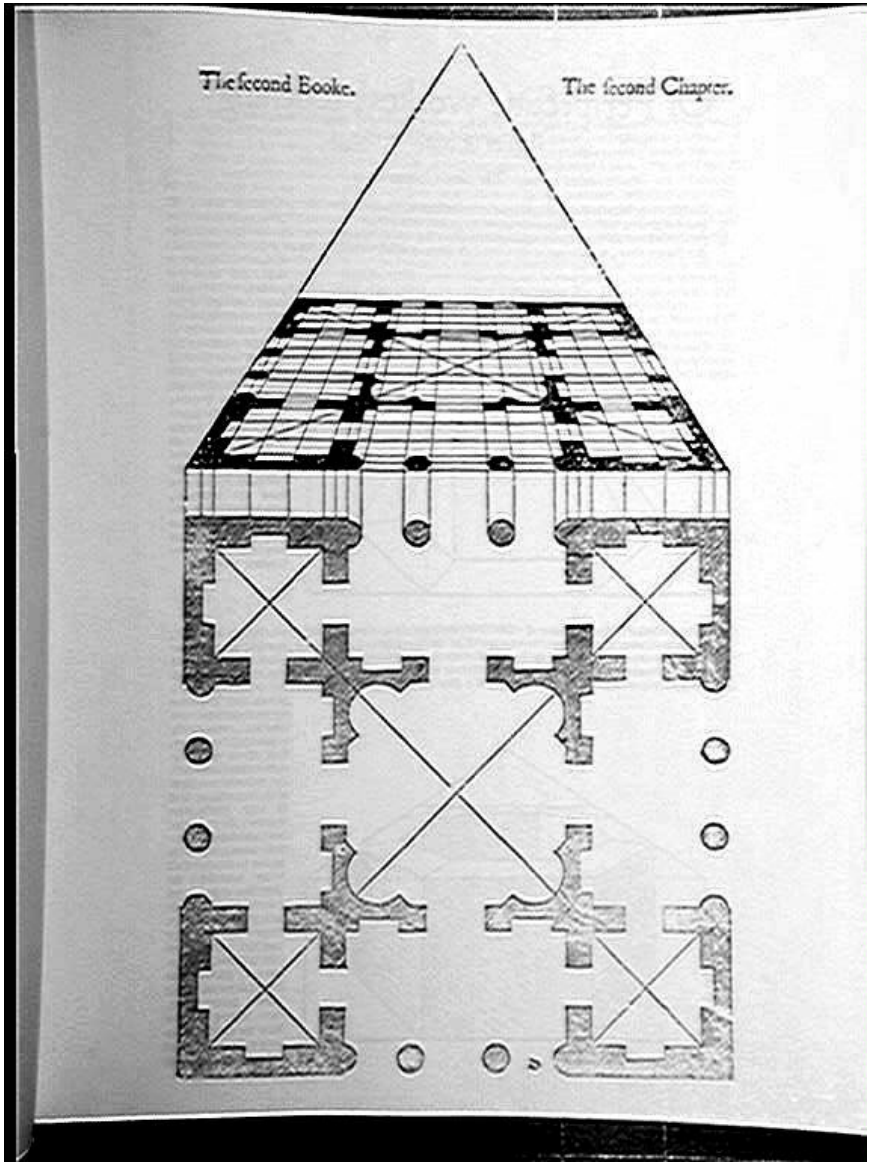
Serlio

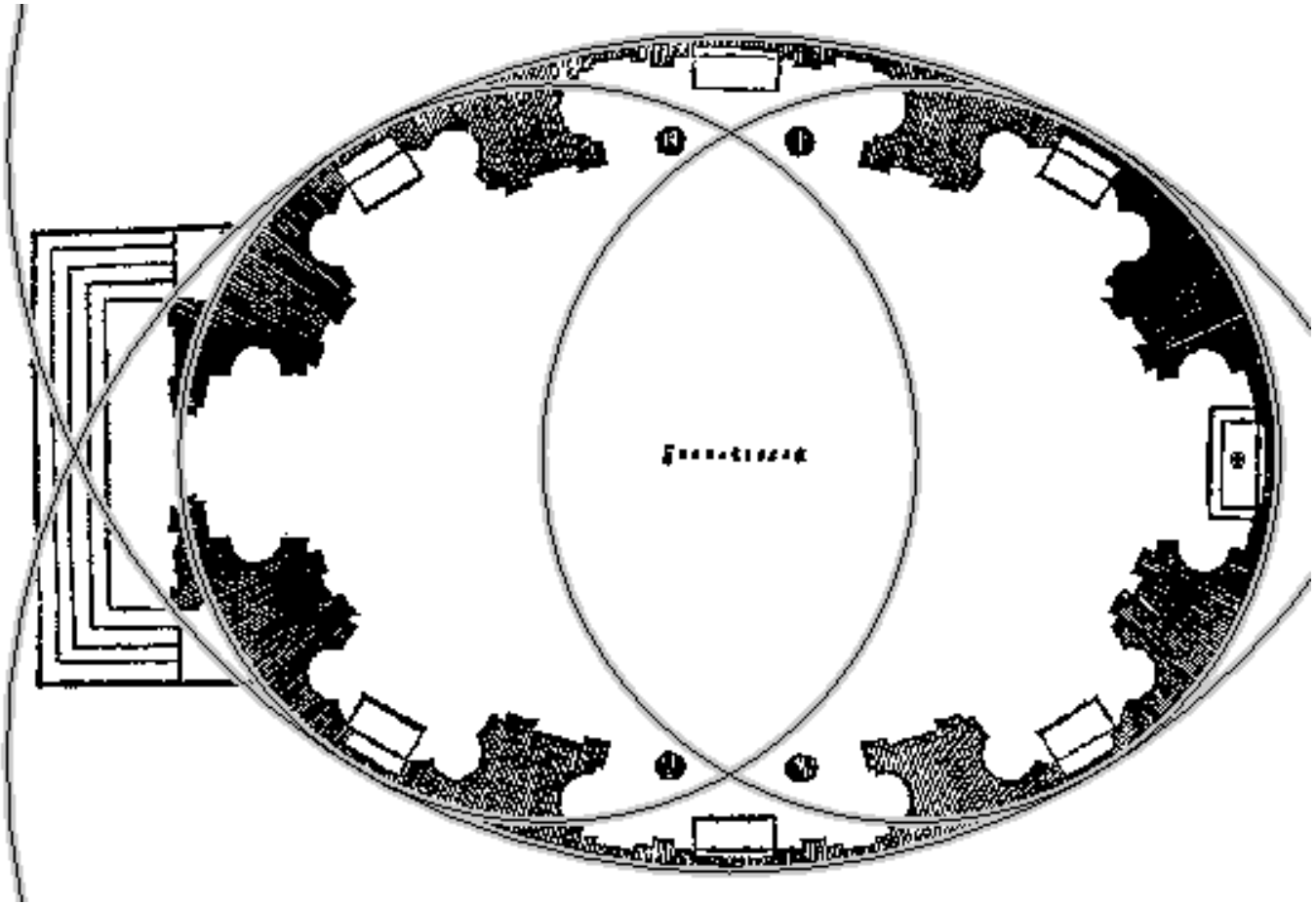


5 Books on Architecture

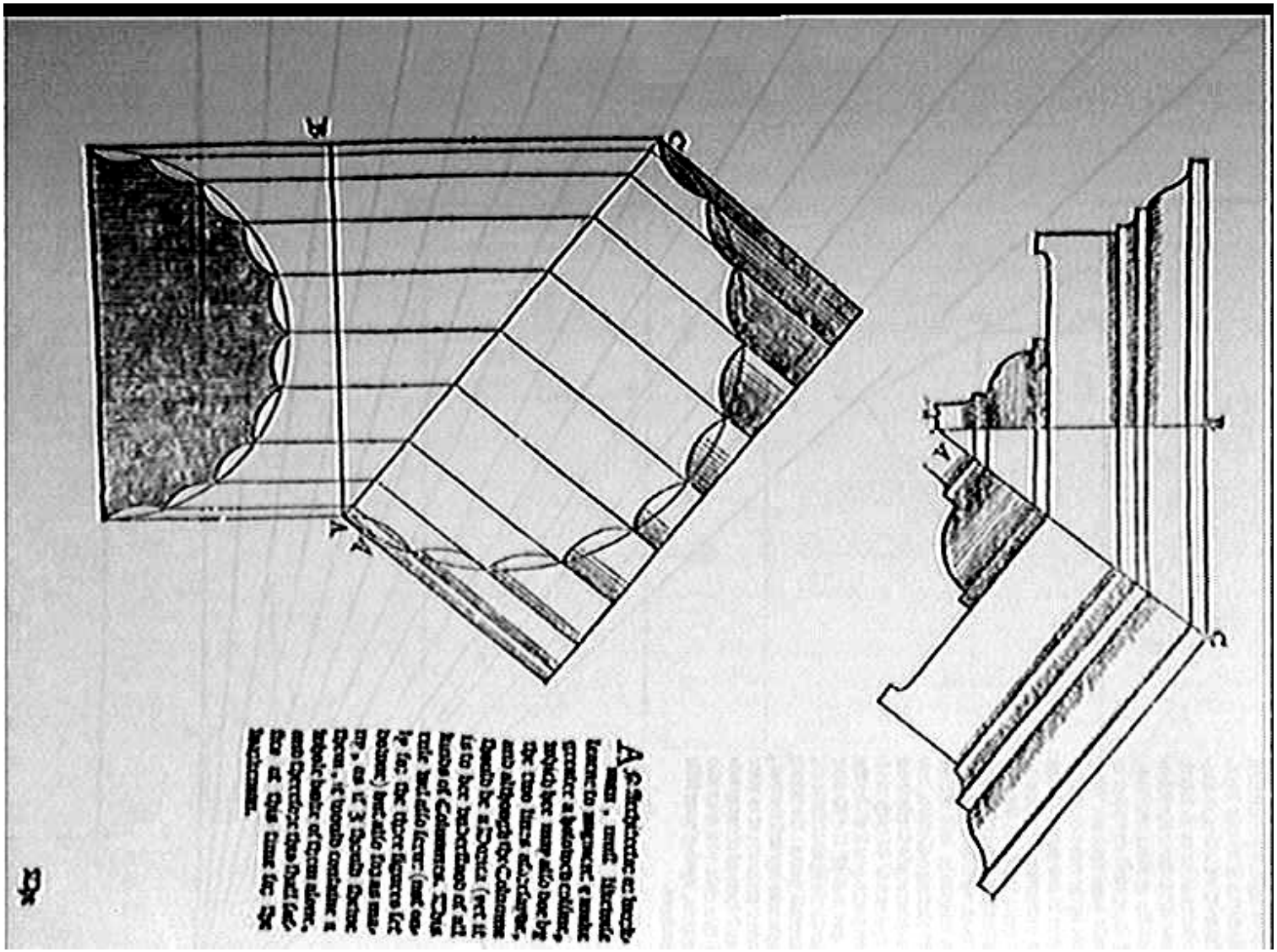





The second Booke.
The second Chapter.

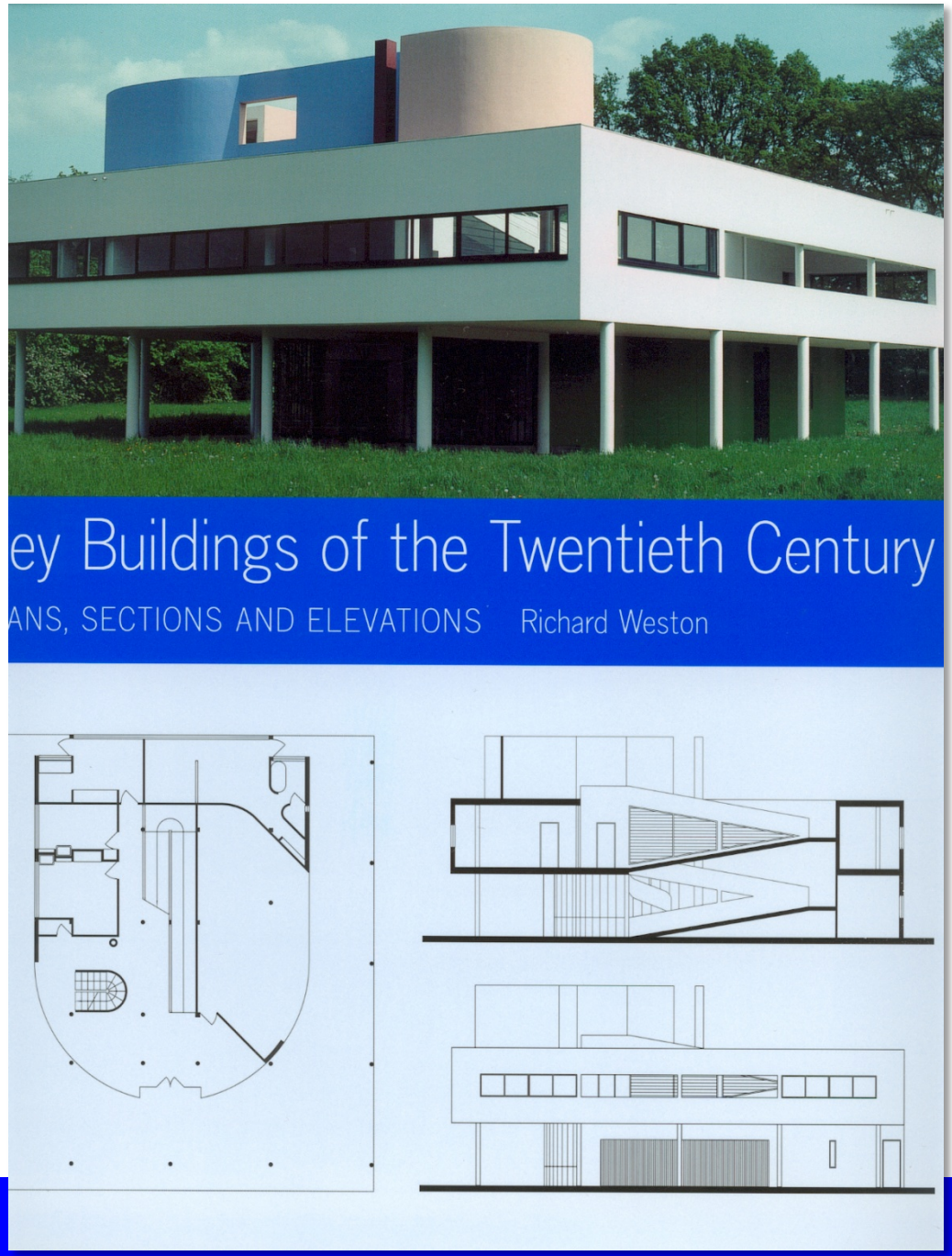


How to construct an oval when your ellipse template is too small – compliments of Sebastiano Serlio…



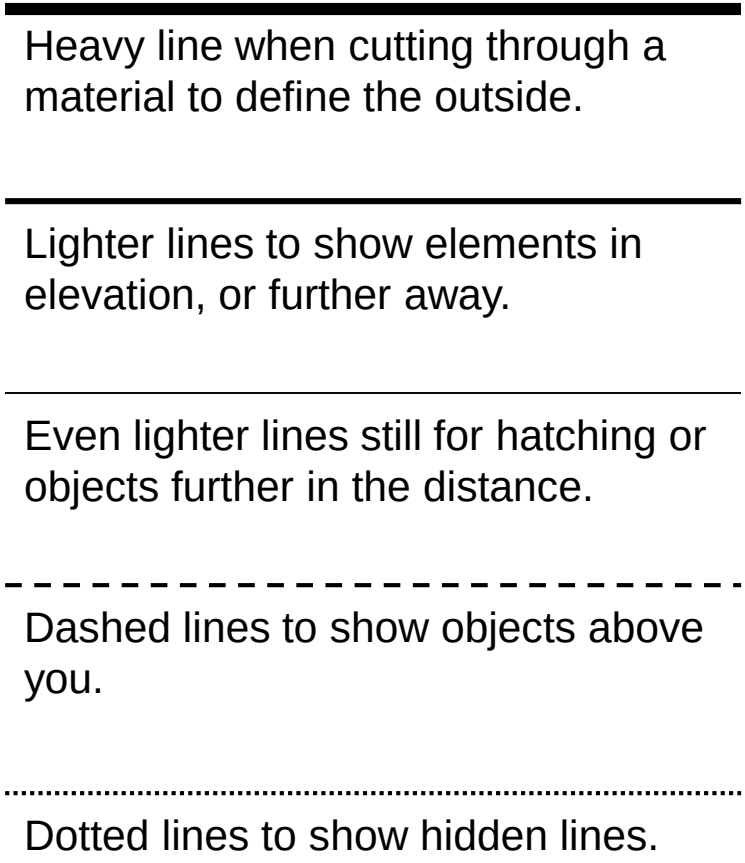
How to subdivide a space into equal intervals – compliments of Sebastiano Serlio…

Design Drawings

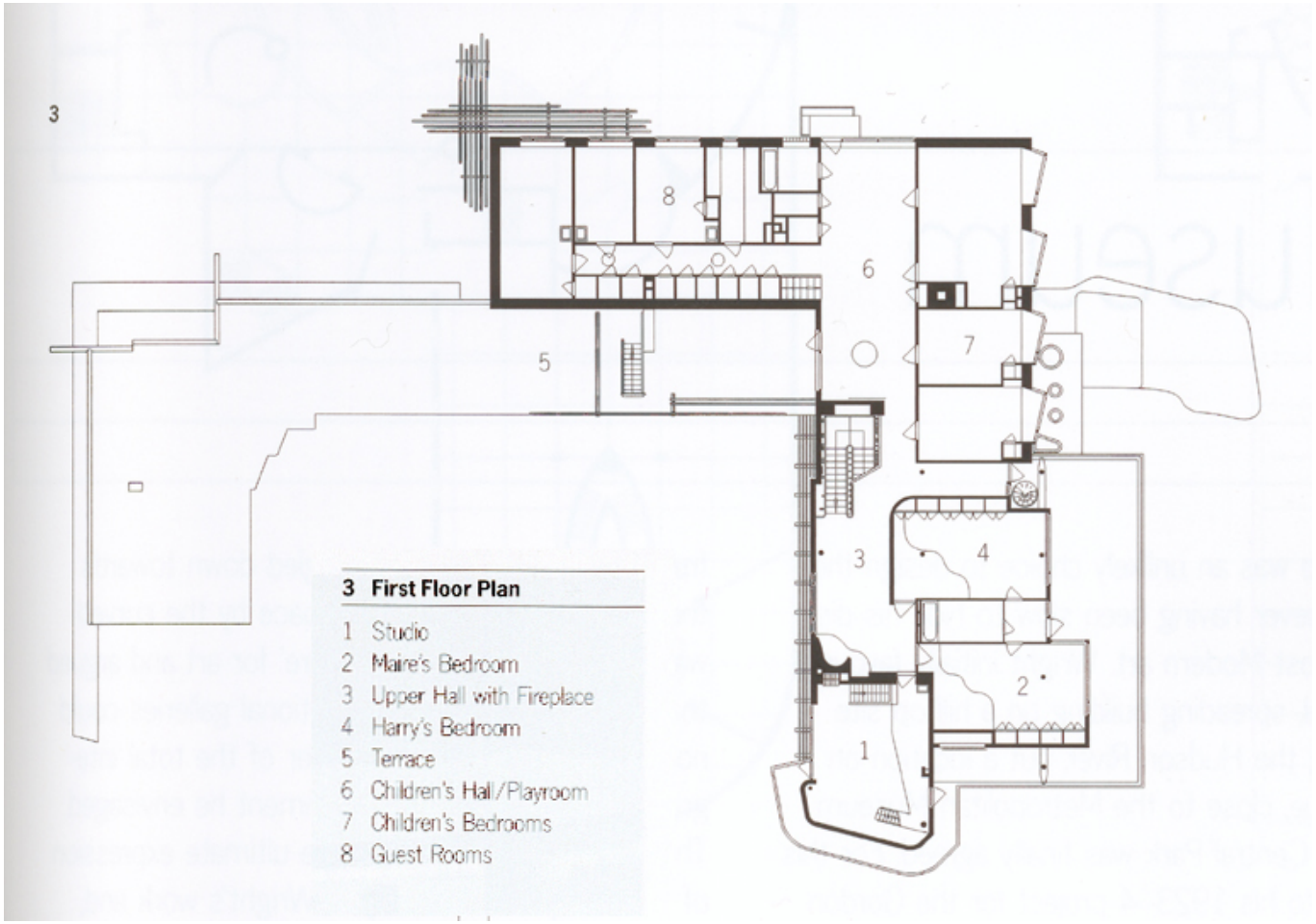


lines

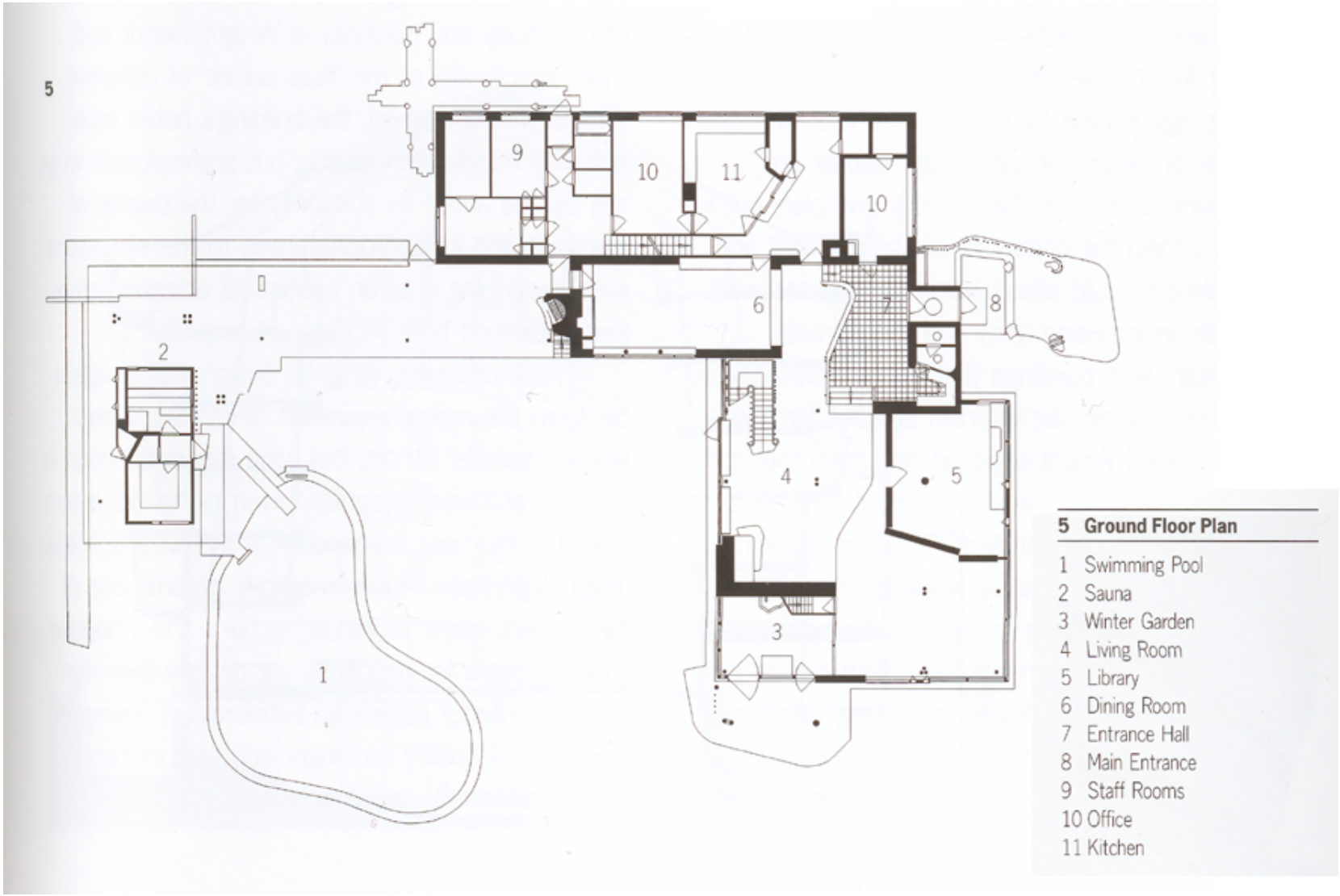
Lineweights are differentiated, whether you are drawing in ink or pencil, by hand or with CAD.



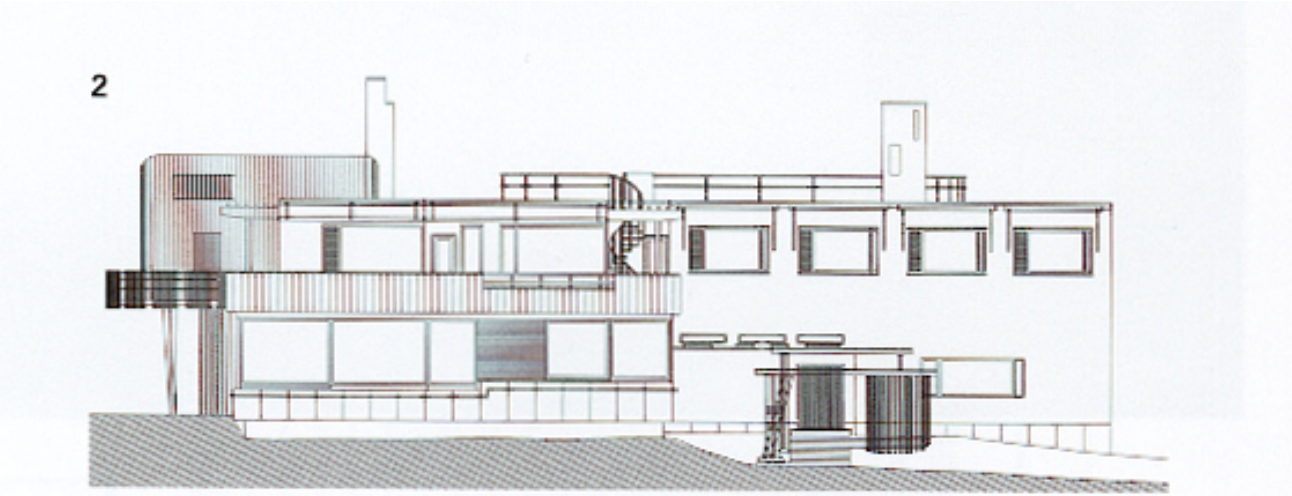
villa mairea – alvar aalto

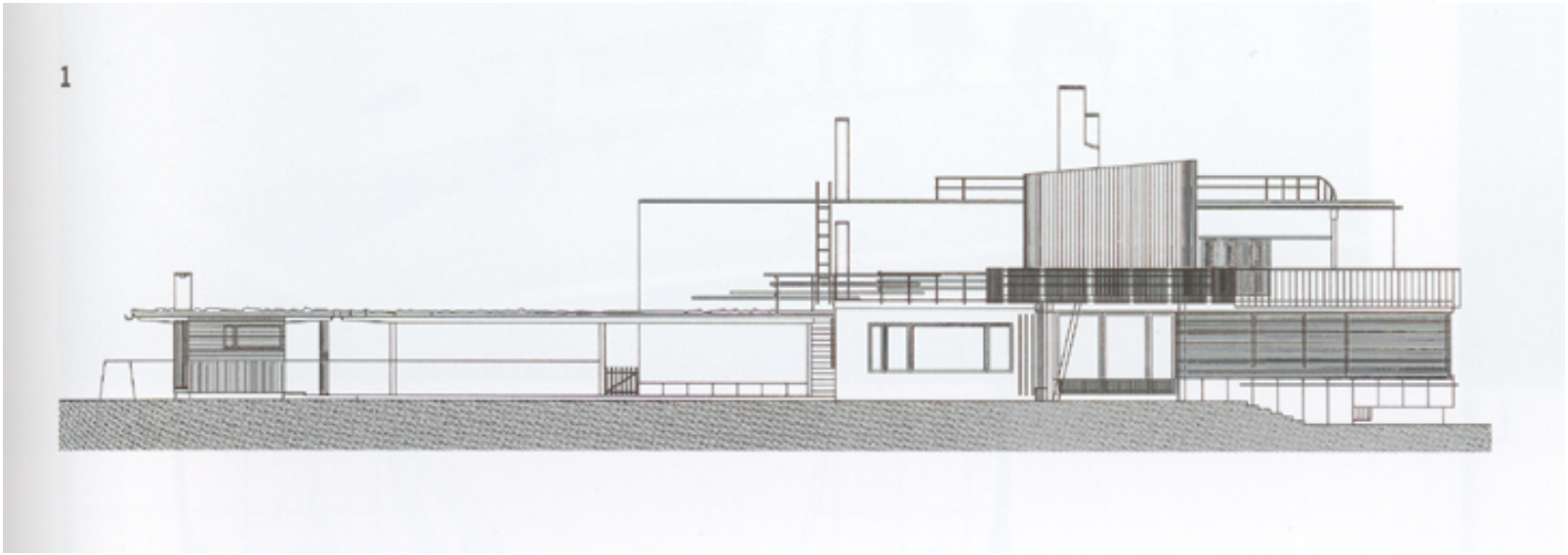


Note: a floor plan is actually a sectional view of a building, the cut taken at 4' or 1.2 m, looking down.

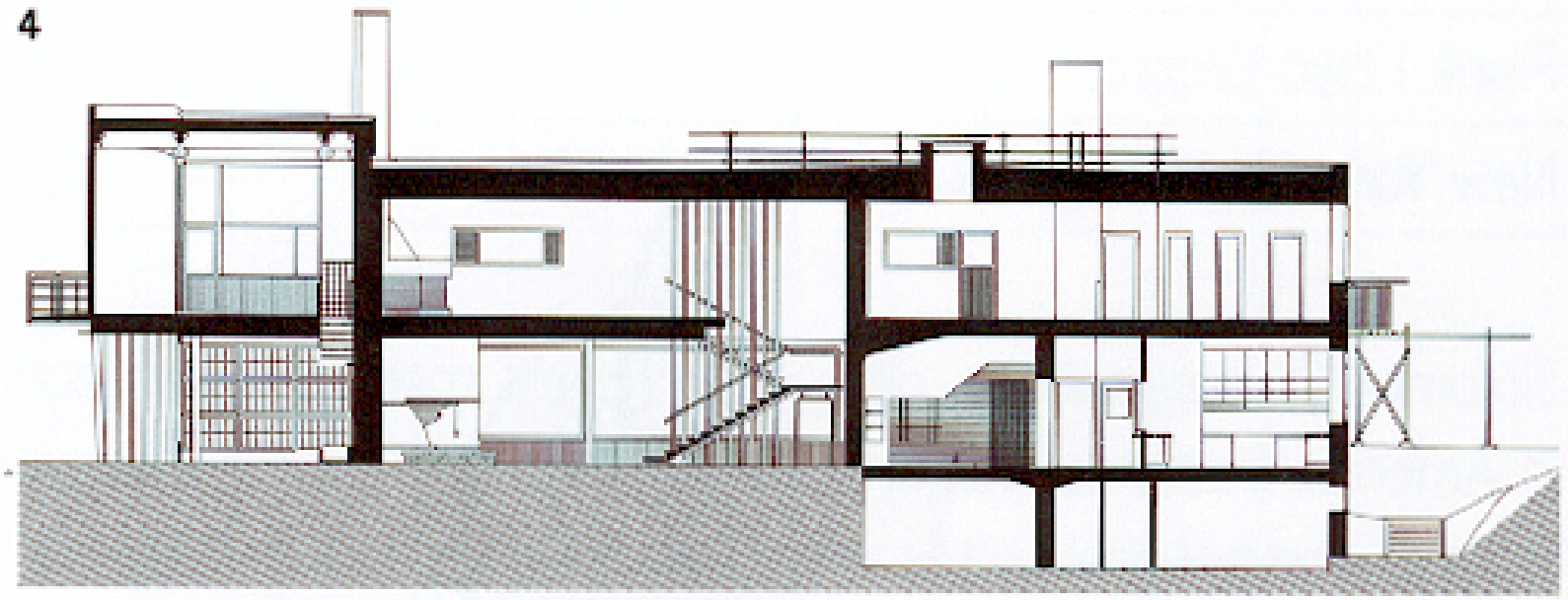


Note rooms are labeled via numbers and a key. Walls are blackened in to create a better graphic and purposefully do not show materials.



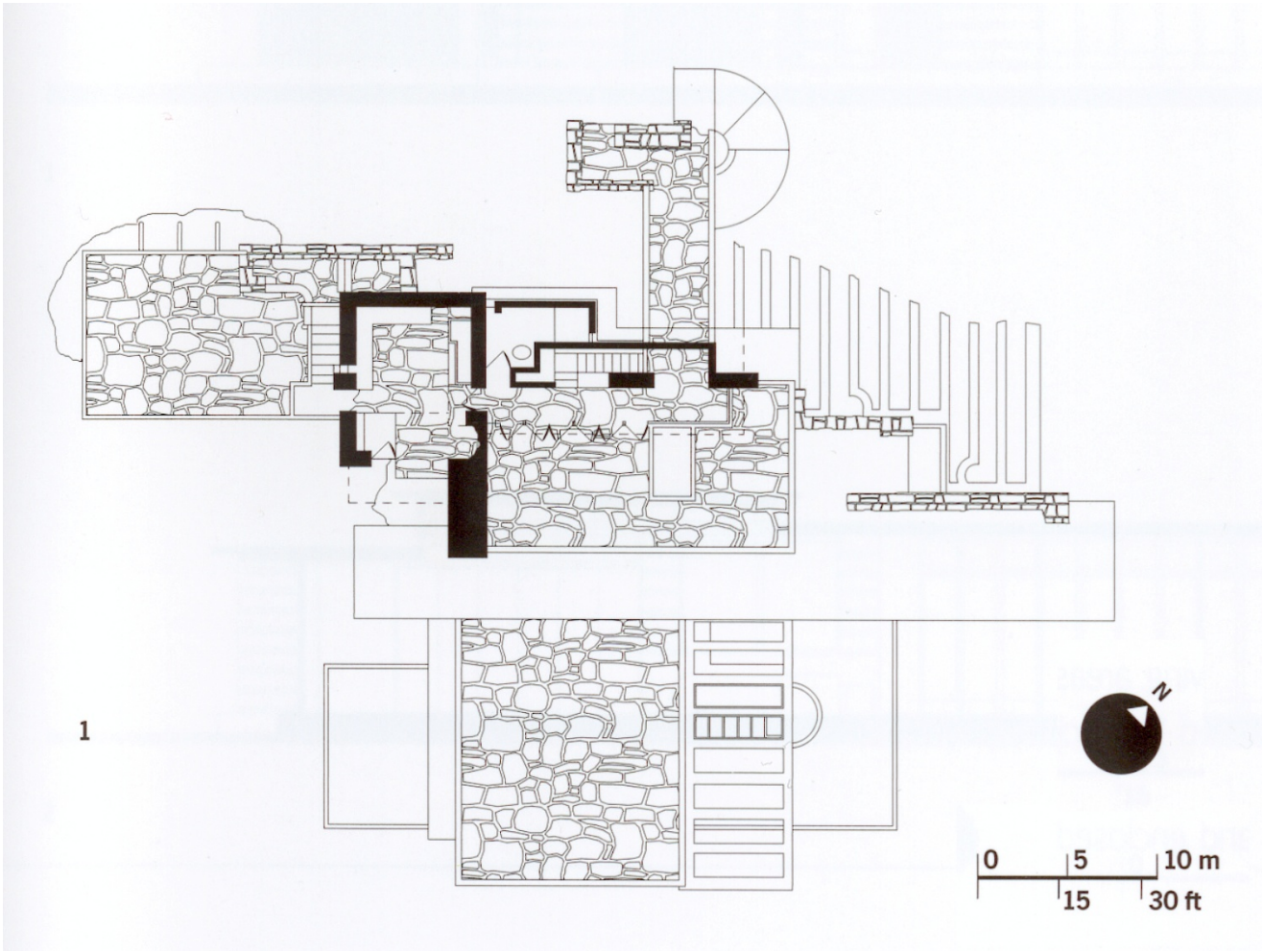


Villa Mairea elevations: note materials are hatched but not labeled.

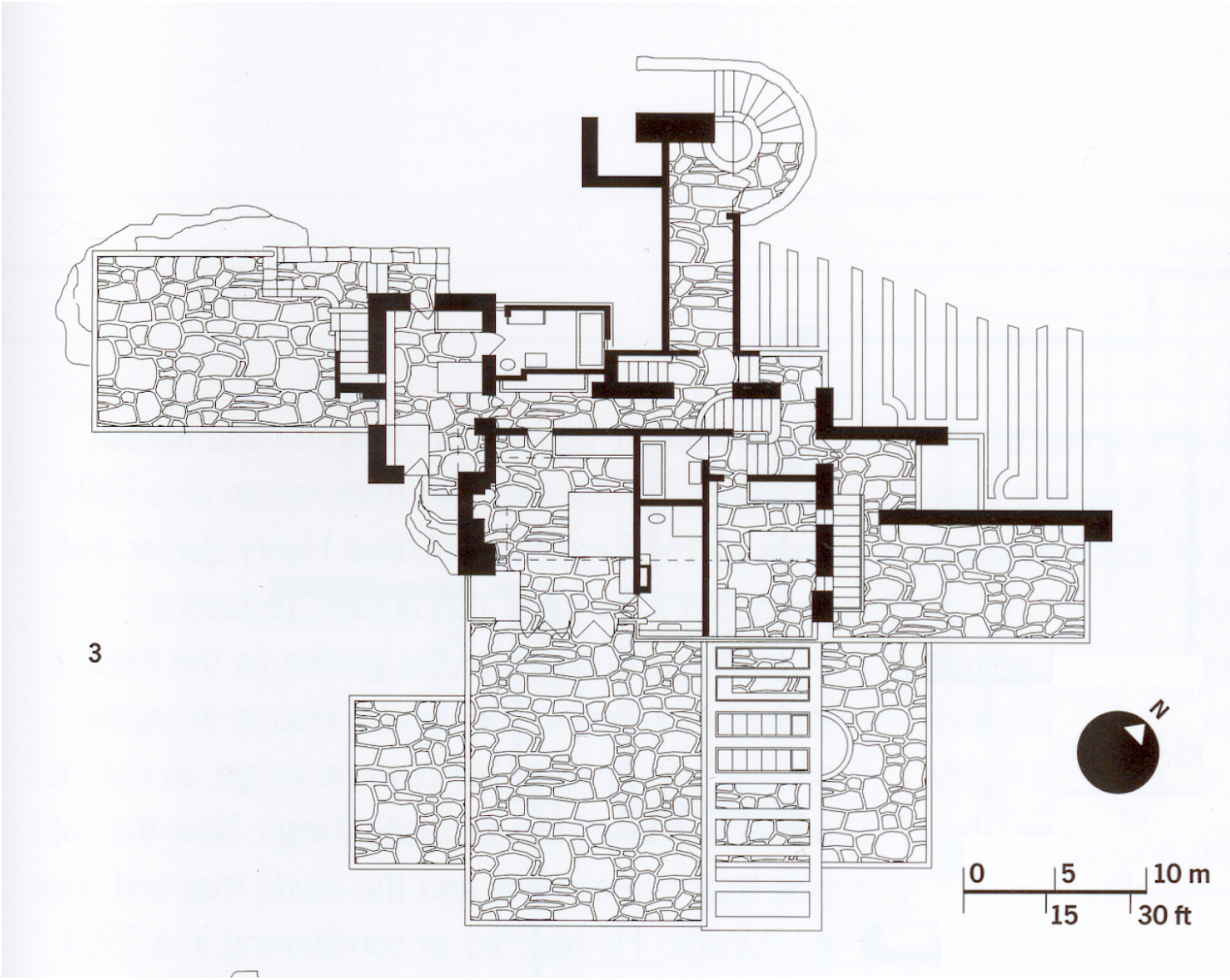


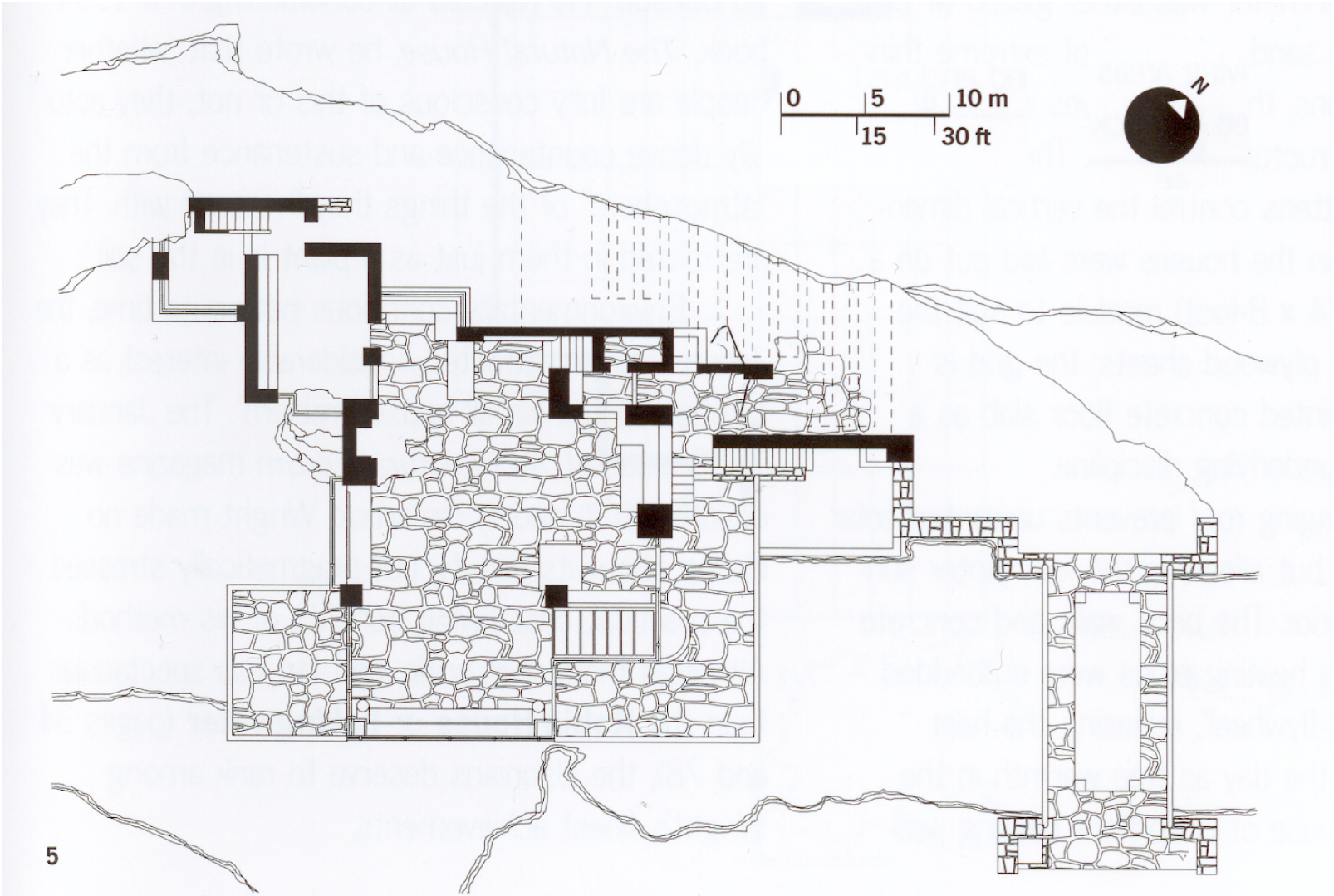
Villa Mairea section: note that design drawing sections *USUALLY* blacken in their walls so that materiality is purposefully not shown.

falling water – frank lloyd wright

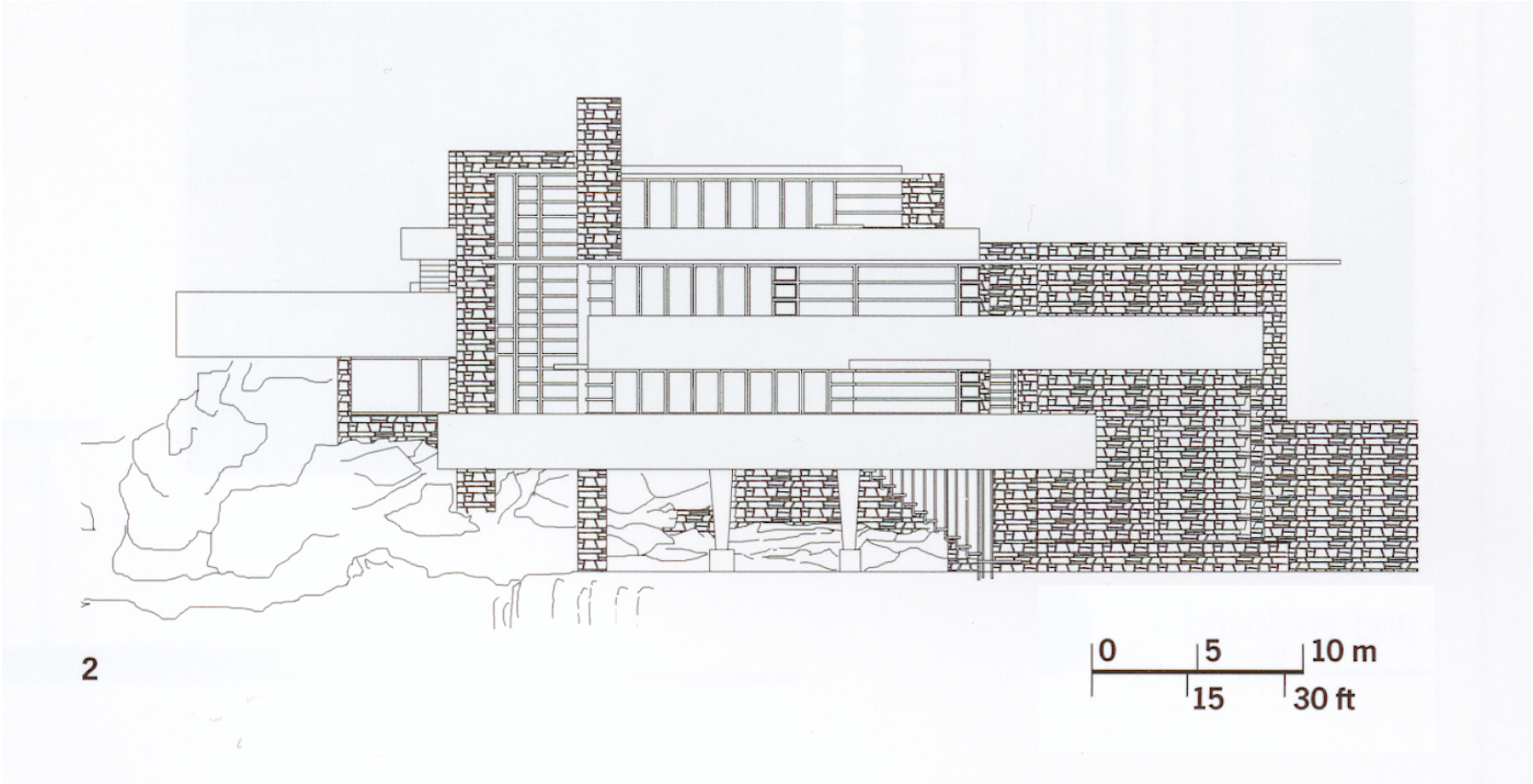


Note!! North arrow and graphic scale

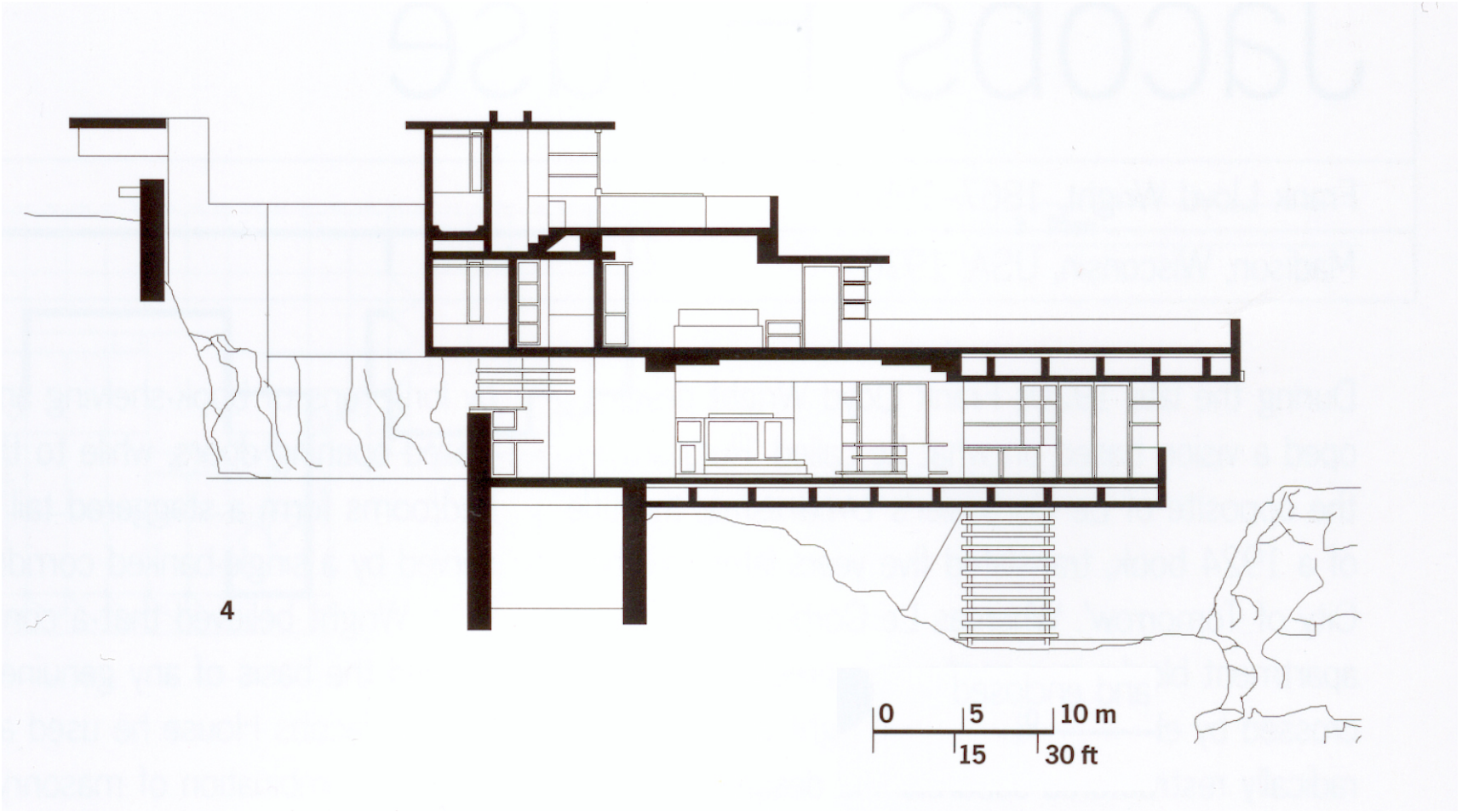

3
N
0
5
10 m
15
30 ft



Hatching of materials in the plan view is contrasted by the blackness of the walls.

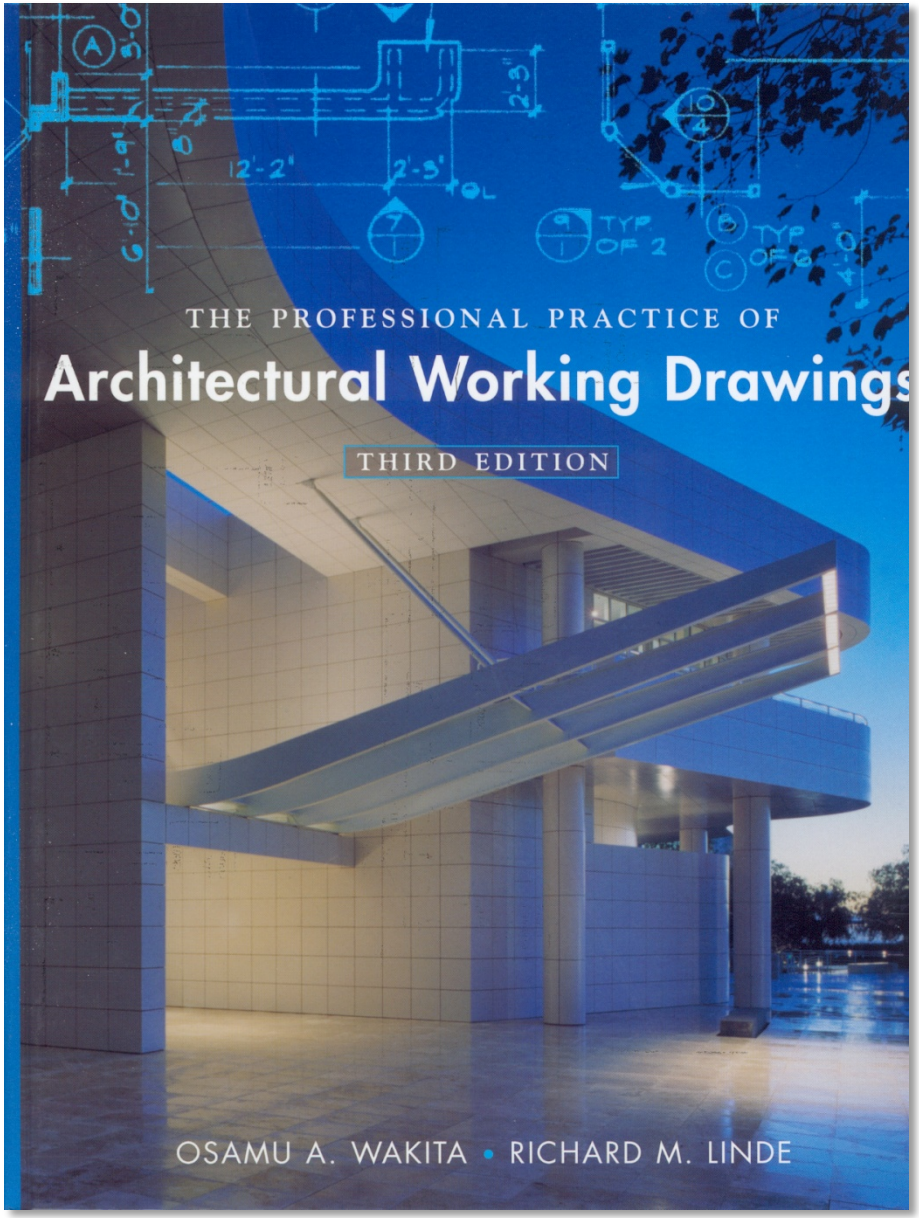


2



Again note that in a design drawing the walls are blackened in. The graphic scale allows the drawing to be reduced or enlarged and the scale still valid.

Working Drawings



lettering

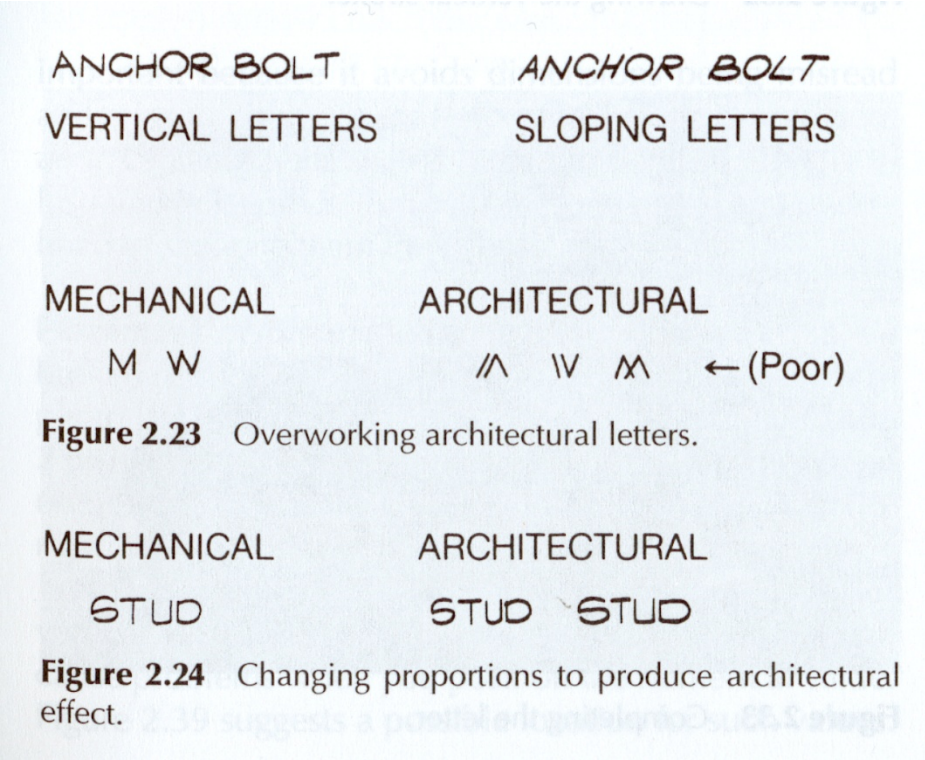


Figure 2.23 Overworking architectural letters.

Figure 2.24 Changing proportions to produce architectural effect.

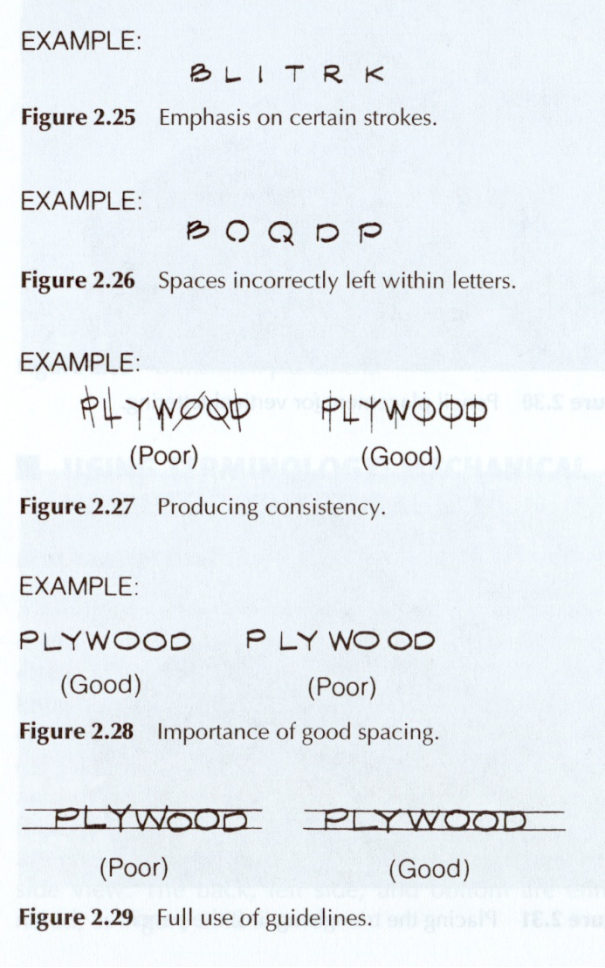


Figure 2.25 Emphasis on certain strokes.

Figure 2.26 Spaces incorrectly left within letters.

Figure 2.27 Producing consistency.

Figure 2.28 Importance of good spacing.

Figure 2.29 Full use of guidelines.

Make guidelines and use a small triangle to ensure that your verticals are VERTICAL and not *SLOPED* or U*N*EV*E*N.

lines

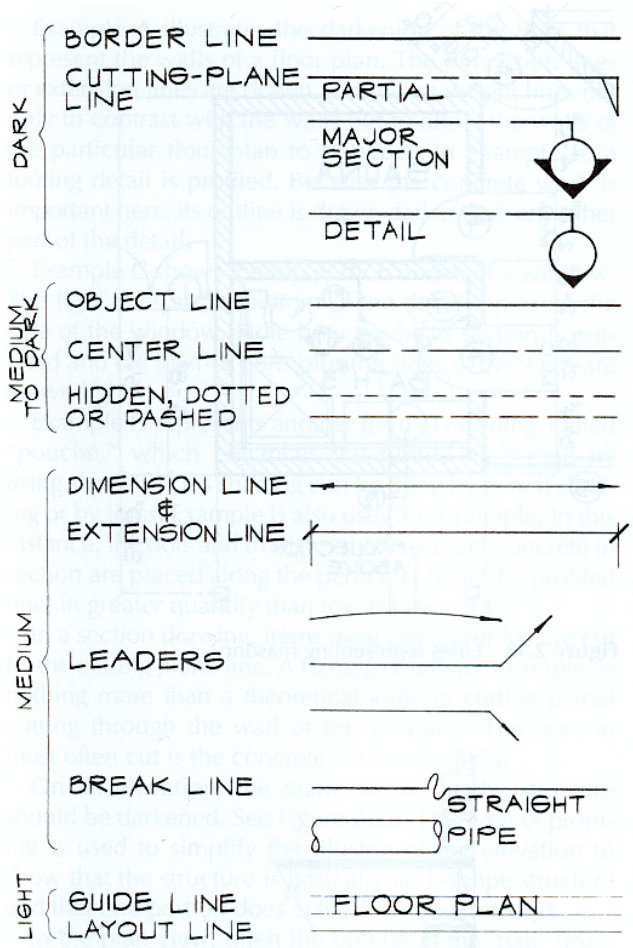


Figure 2.14 Vocabulary of architectural lines.

For contract documents

Heavy line when cutting through a material to define the outside.

Lighter lines to show elements in elevation, or further away.

Even lighter lines still for hatching or objects further in the distance.

Dashed lines to show objects above you.

Dotted lines to show hidden lines.

Lines in general

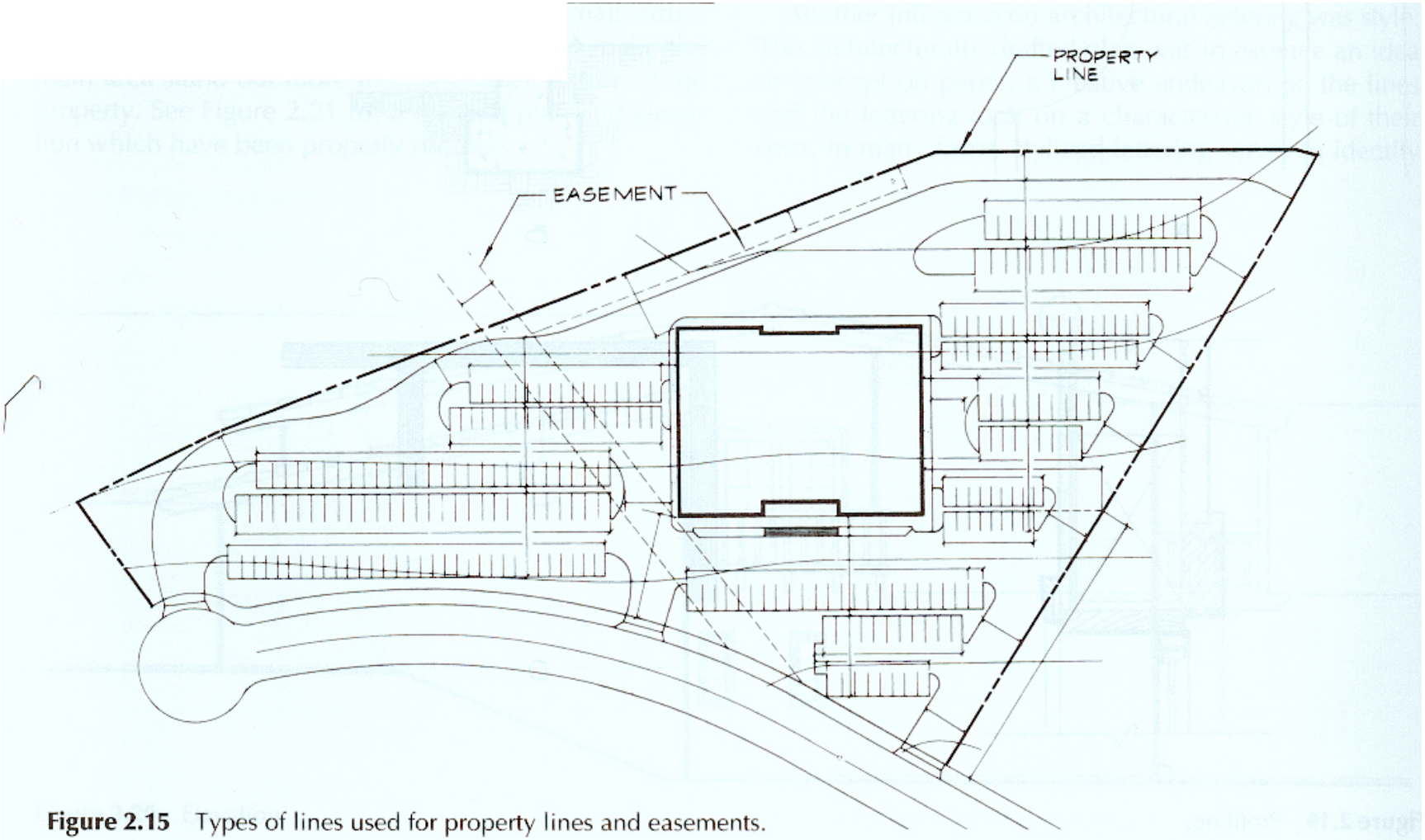


Figure 2.15 Types of lines used for property lines and easements.

Different lines on a site plan…

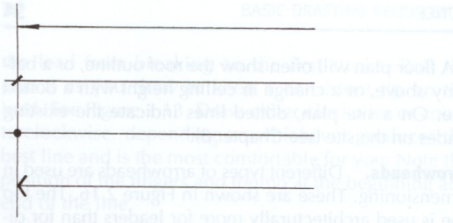


Figure 2.16 Types of arrowheads used in dimensioning.

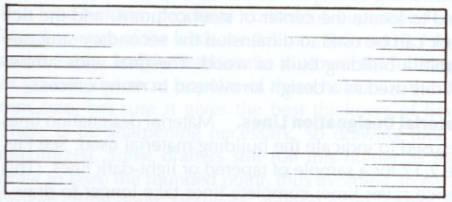


Figure 2.17 Tapered lines.

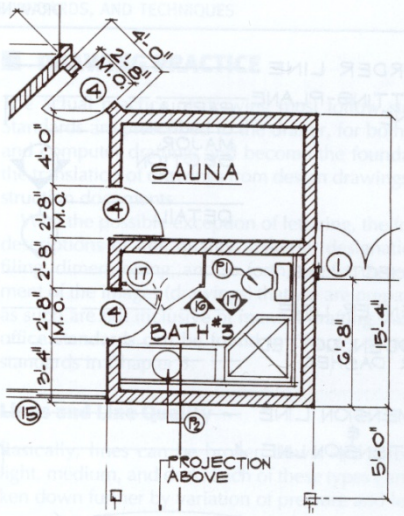
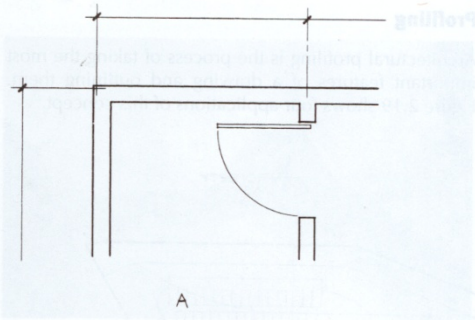
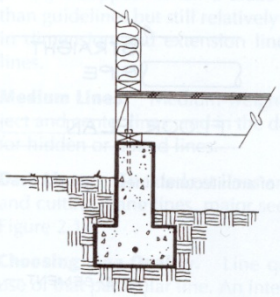
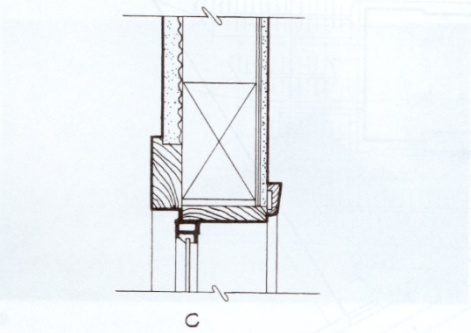


Figure 2.18 Lines representing masonry.







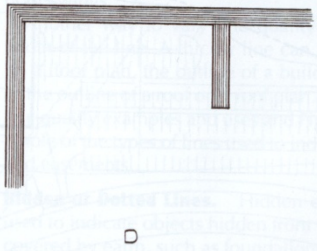


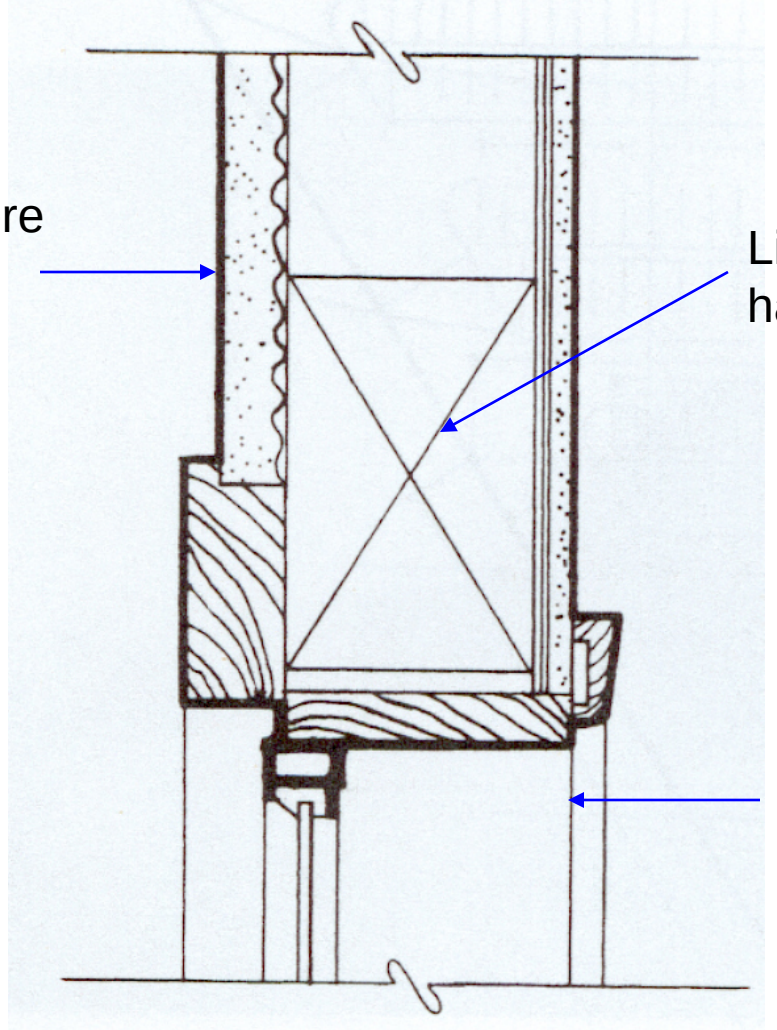
Figure 2.19 Profiling.

Showing different types of lines and lineweights in various applications.

We differentiate so that the drawing communicates ideas more clearly.

line weight

Heavy outline where cut in section



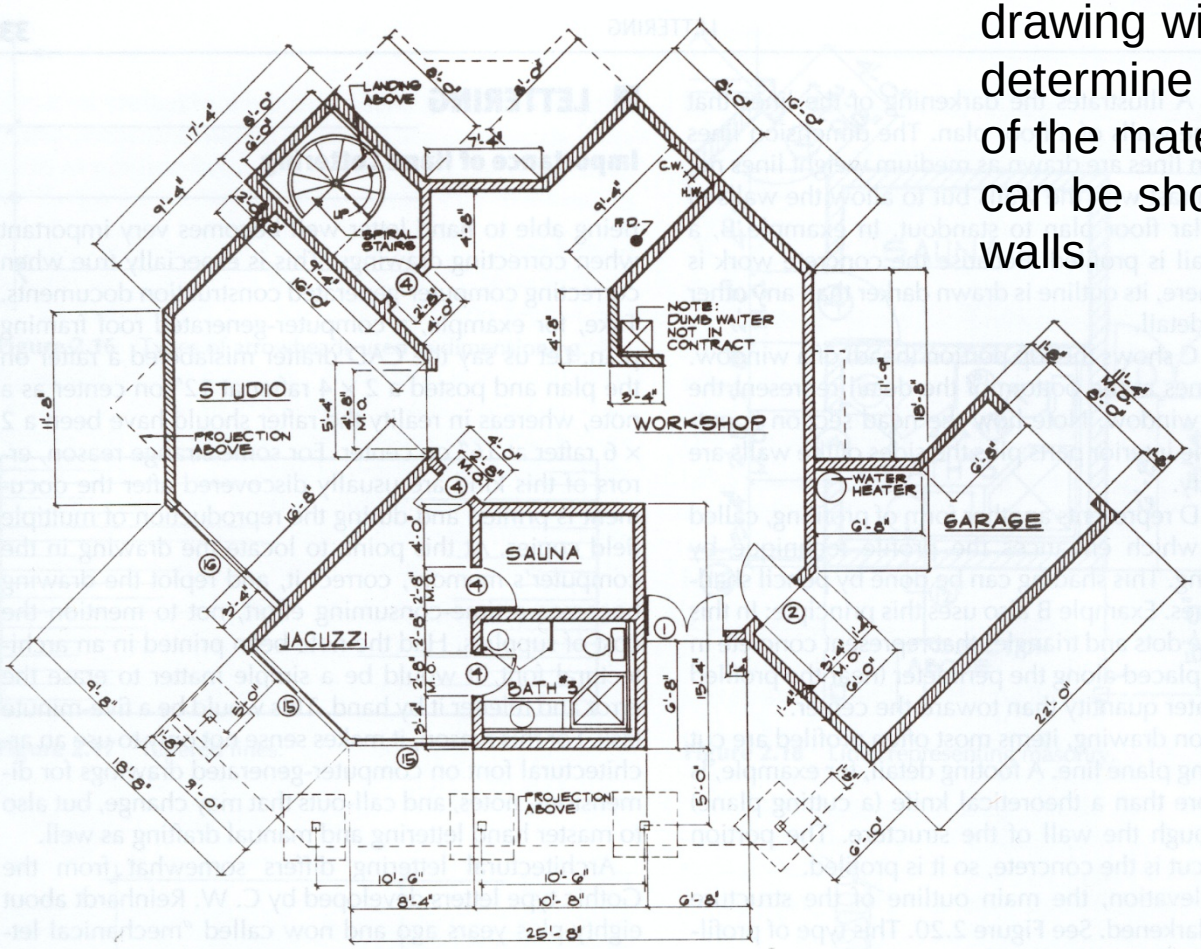
Lighter lines for hatching

Lighter lines to show materials “beyond”

plan view

The scale of the plan drawing will determine how much of the material layers can be shown in the walls.

Note: door swings are shown as ¼ circles so that you can tell that the door does not hit anything.



doors

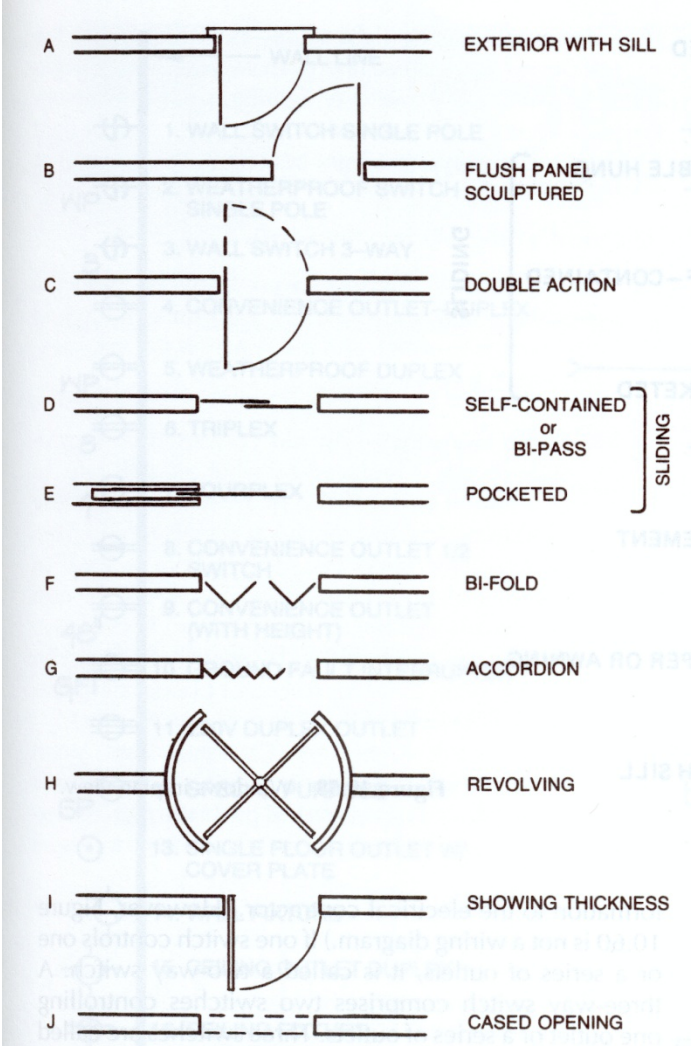


Figure 10.57 Doors in plan view.

The intention of the door swing is to show both what TYPE of door you are using as well as its PATH of motion.

elevation

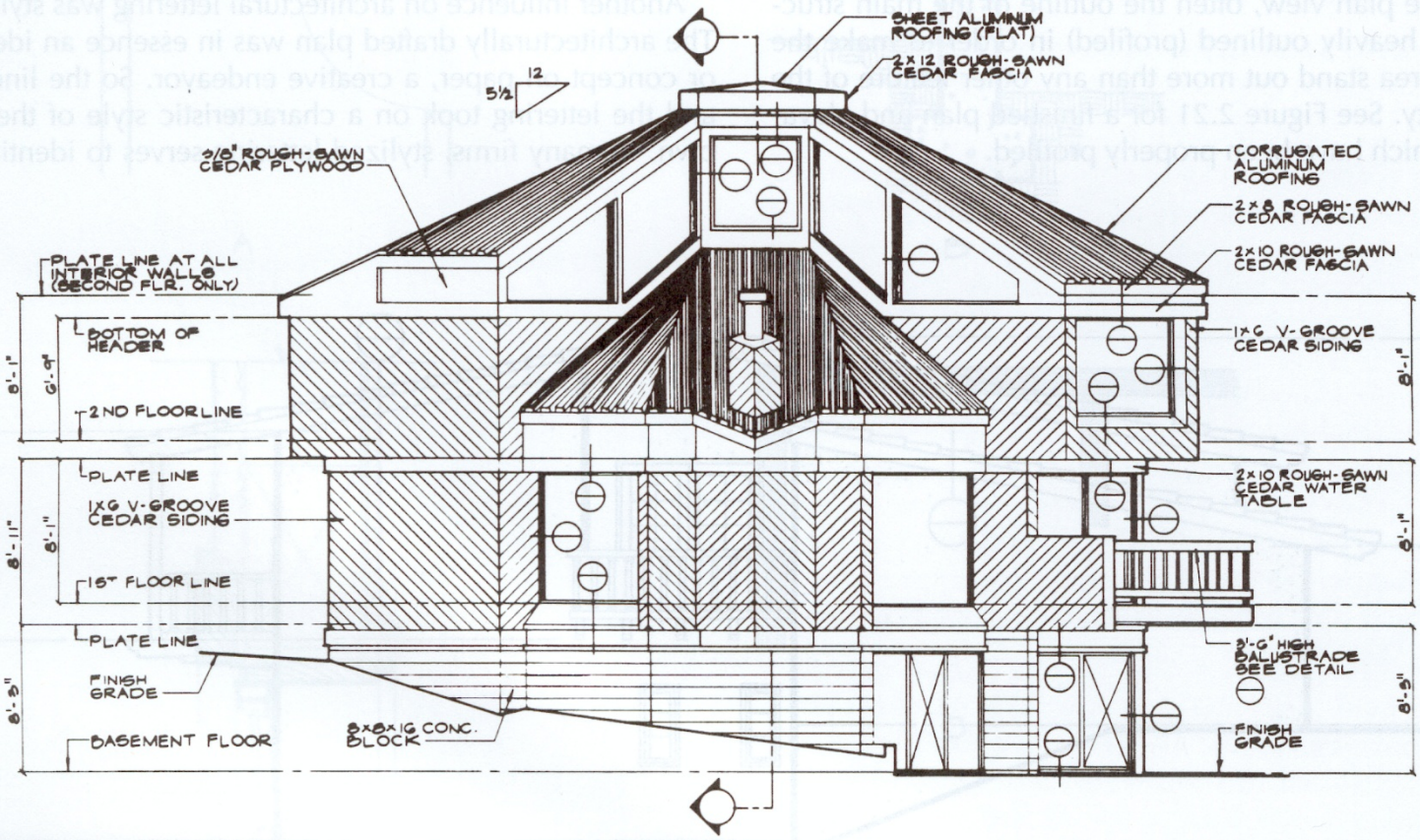


Figure 2.21 Correctly profiled plan and elevation.

dimension lines

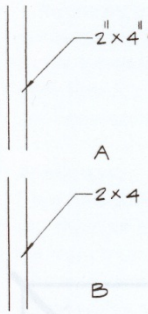


Figure 2.34 Net and nominal notation.

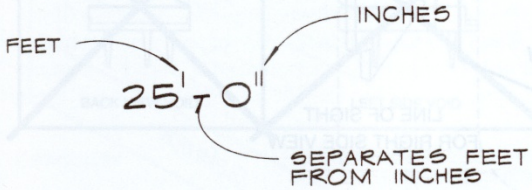


Figure 2.35 Expressing feet and inches.

Figure 2.36 Dimensions in a restricted area.

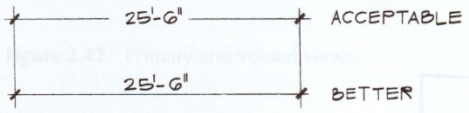


Figure 2.37 Placement of dimensions above or between dimension line.

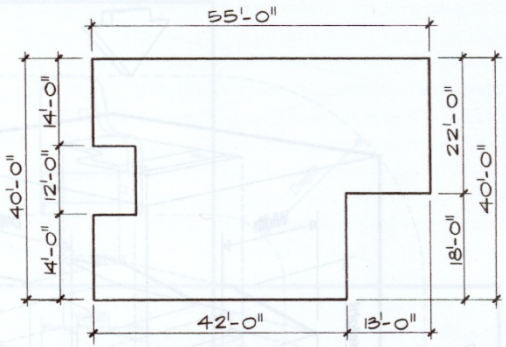


Figure 2.38 Dimensions read from bottom and from the right.

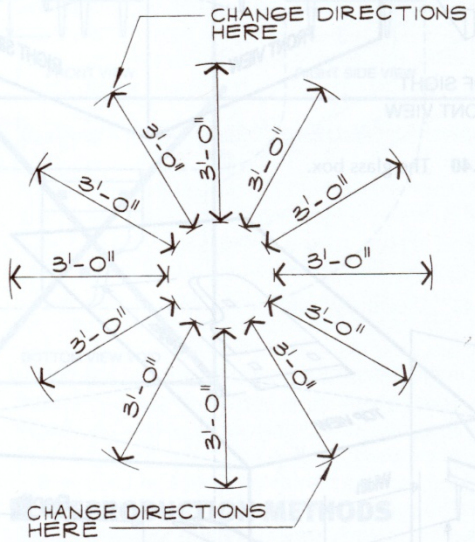
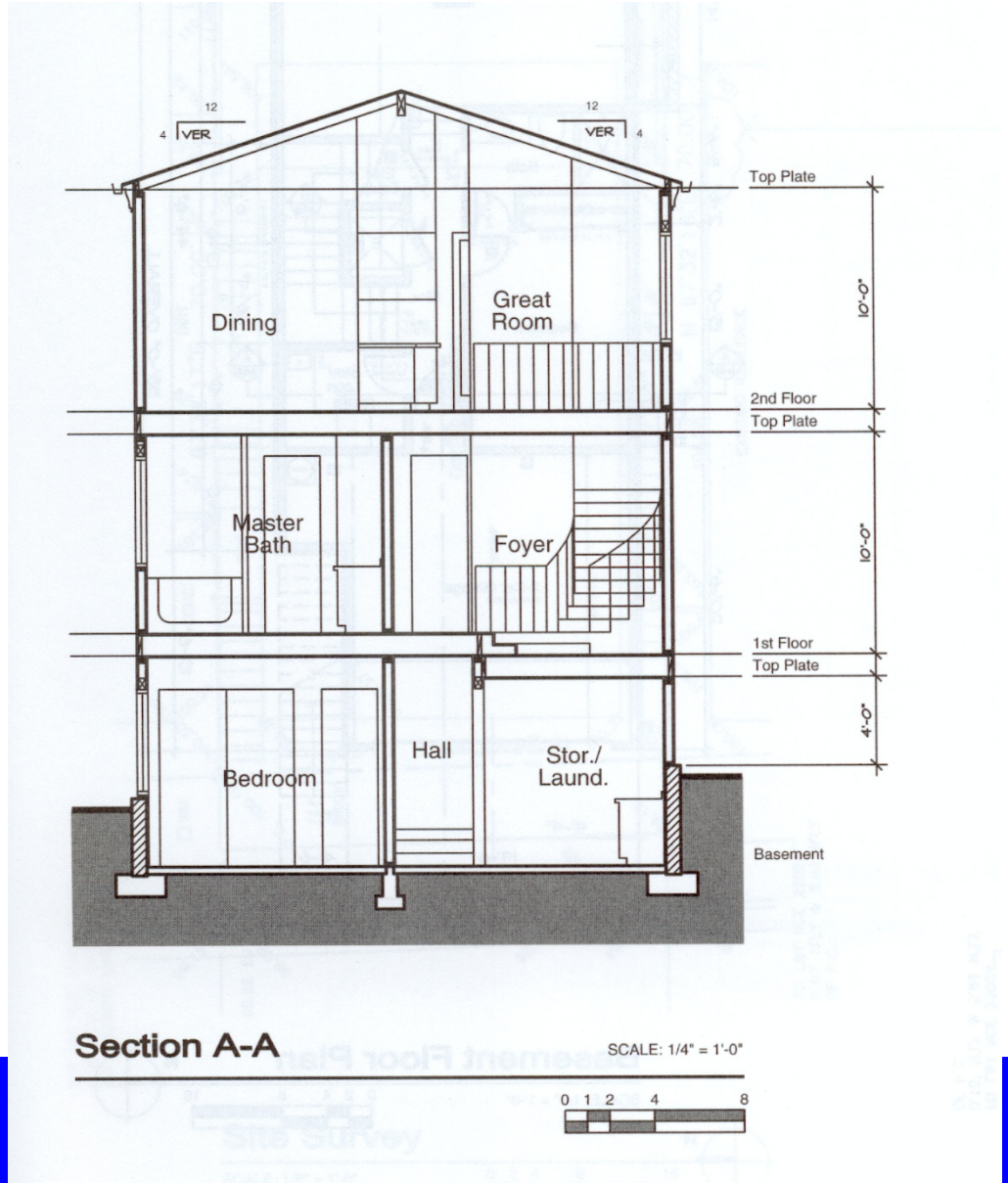


Figure 2.39 Dimension placement.

basic section



construction plans

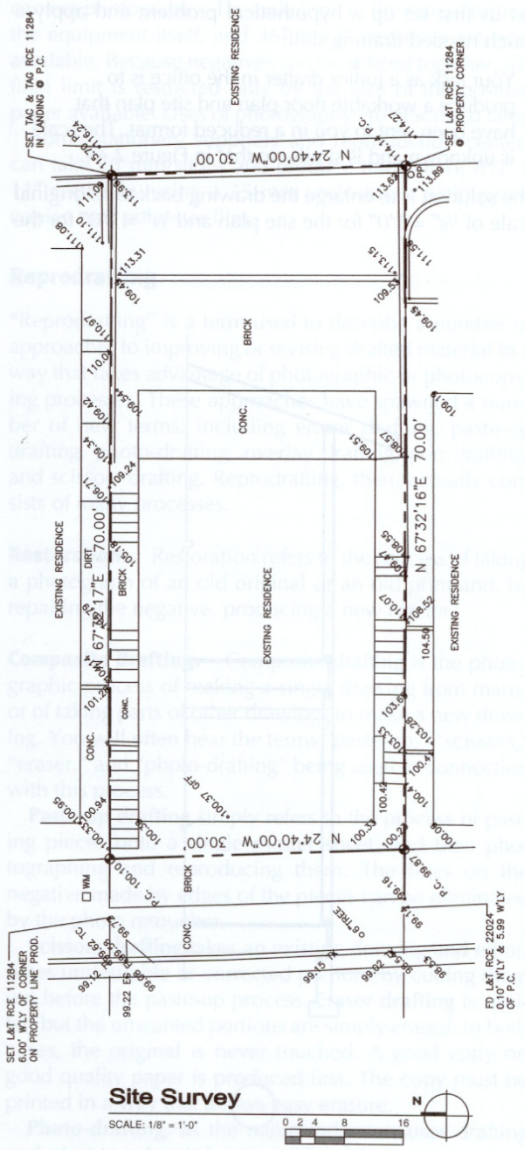
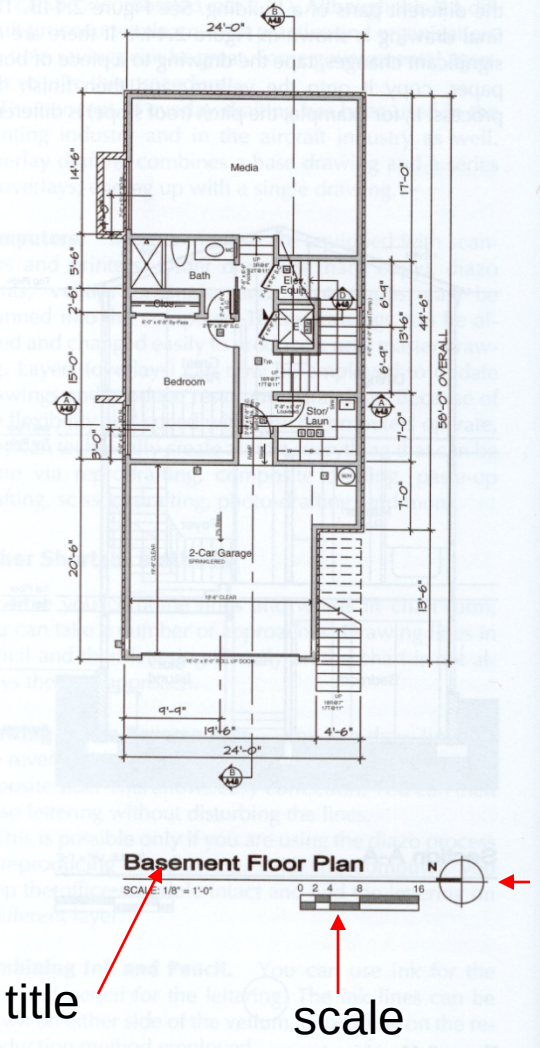


Figure 2.45 Site plan and floor plan (unknown scale).



title

scale

North arrow

Note use of dimensions and walls are NOT blackened in as we have to show materials…

hatching…

Materials are hatched in the plan or section view so that it is easier to tell what they are.

Hatching does NOT substitute for labeling.

As you can see from these diagrams, there are many different ways of hatching the same materials – so hatching is not a fail safe way to let the contractor know what material you want to use…

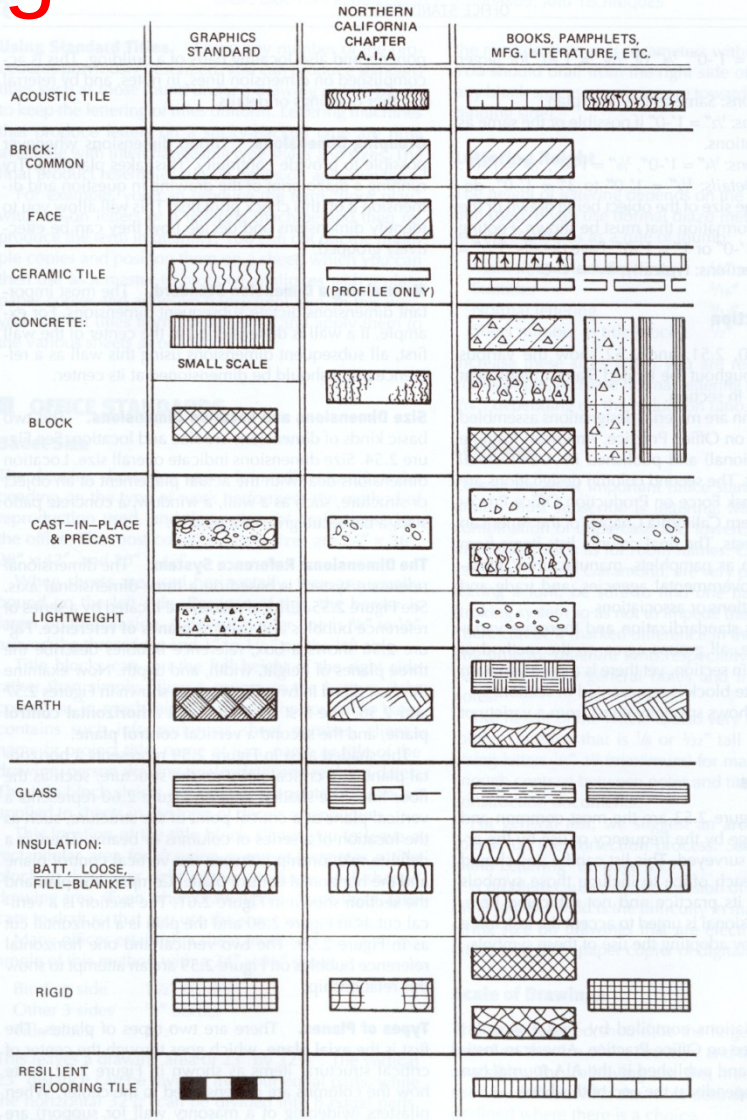


Figure 2.49 Materials in section.

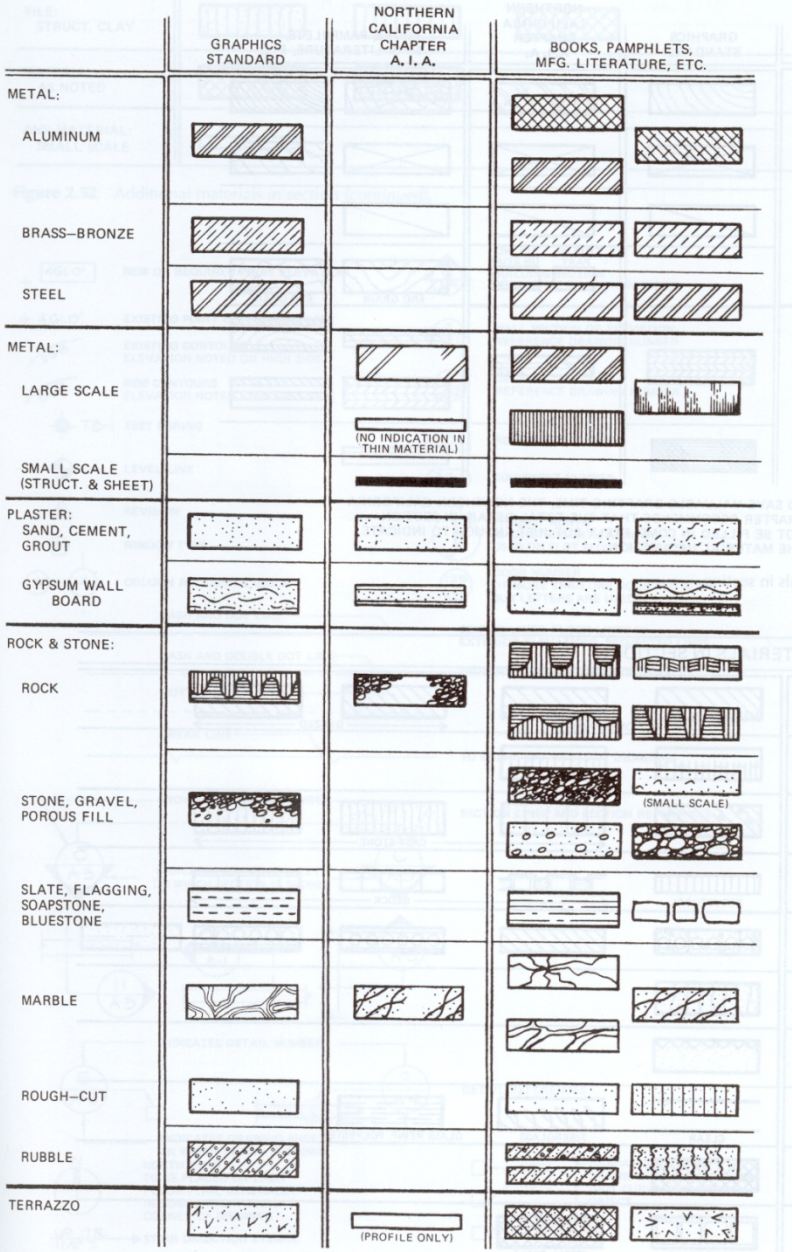


Figure 2.50 Materials in section.

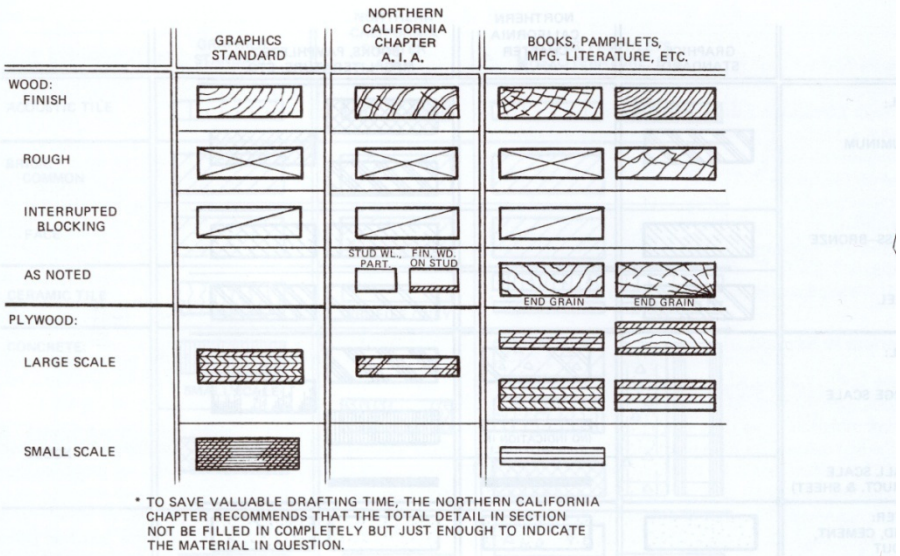


Figure 2.51 Materials in section.

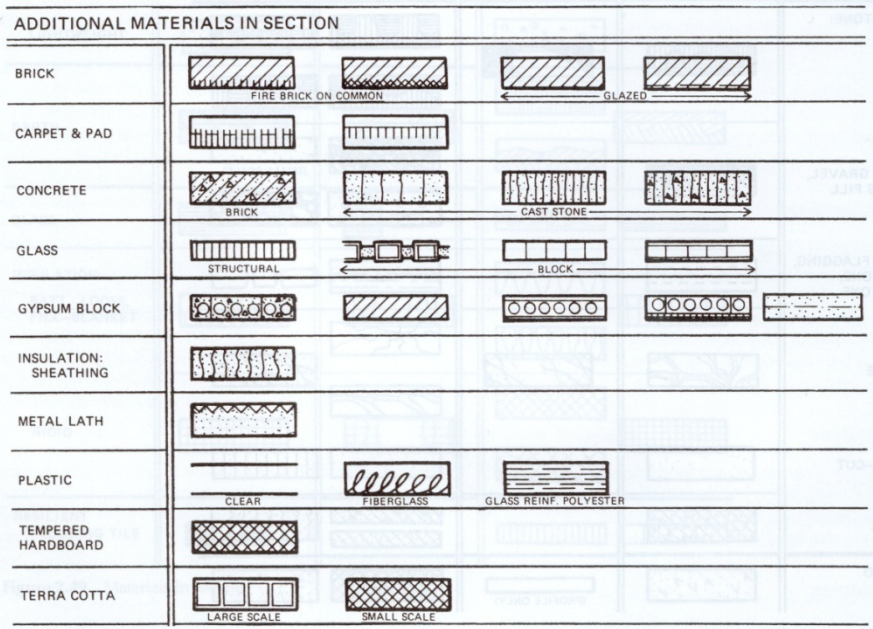


Figure 2.52 Additional materials in section.

gridlines

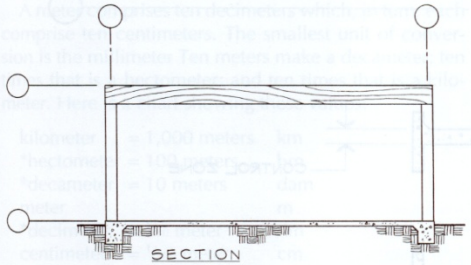


Figure 2.61 Section and plan.

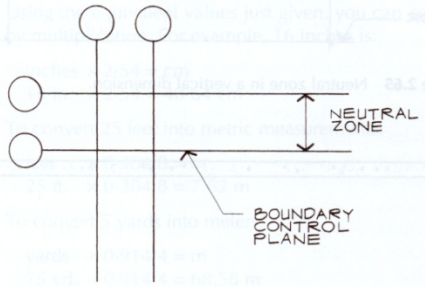


Figure 2.63 Boundary control planes.

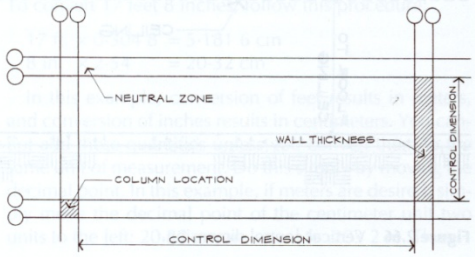


Figure 2.64 Column location in a neutral zone.

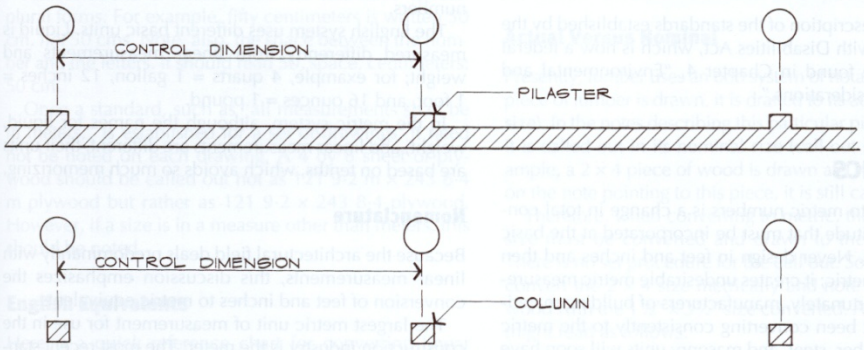


Figure 2.62 Axial control planes.

On buildings with columns or posts, gridlines are used to define the “bay size” and give the centre to centre dimensions for the contractor to lay out the job.

A letter or number goes in the bubble to create a “matrix” on the drawing. A column is noted as being at location C2, for example.

section arrows

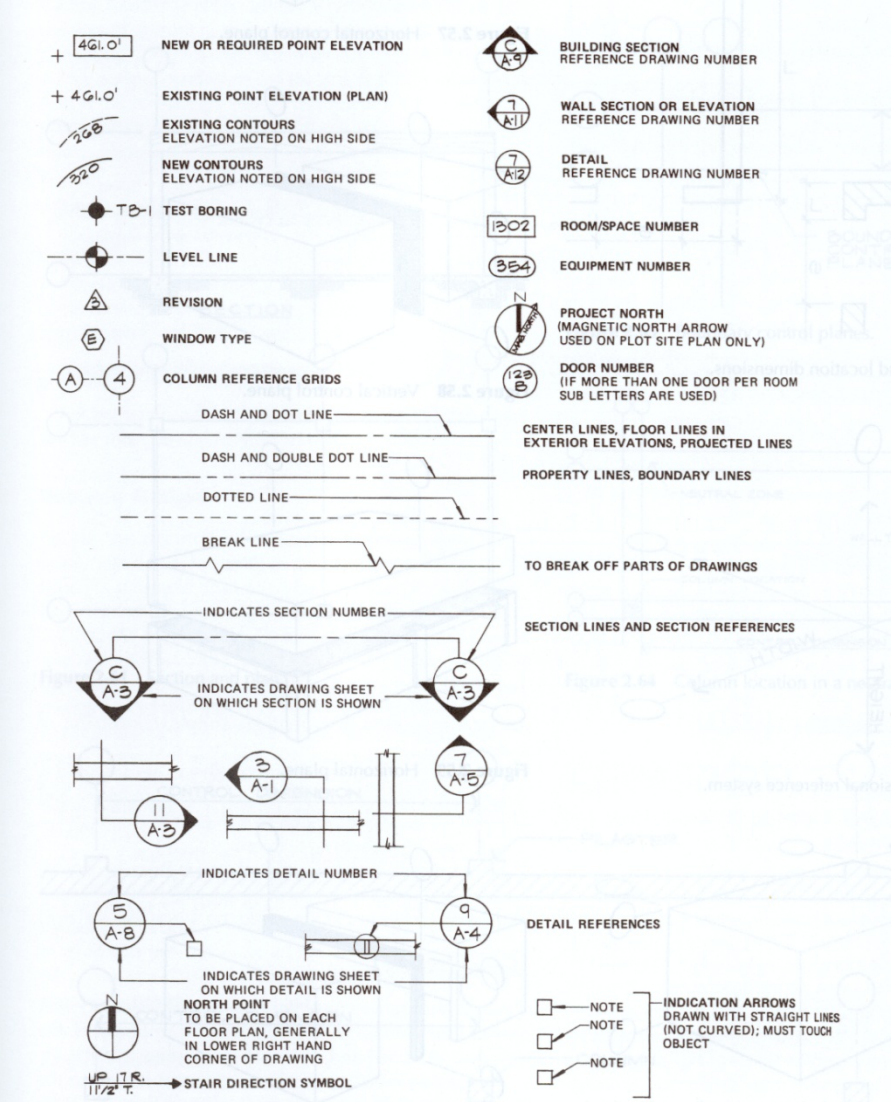


Figure 2.53 Graphic symbols from AIA standards.

Arrows are used to show where sections are cut through the building and which direction the cut is examining.

They are given letters and numbers that also include the page number in the drawing set.

For design/construction drawings we often invent something more graphic.

cartoon layout

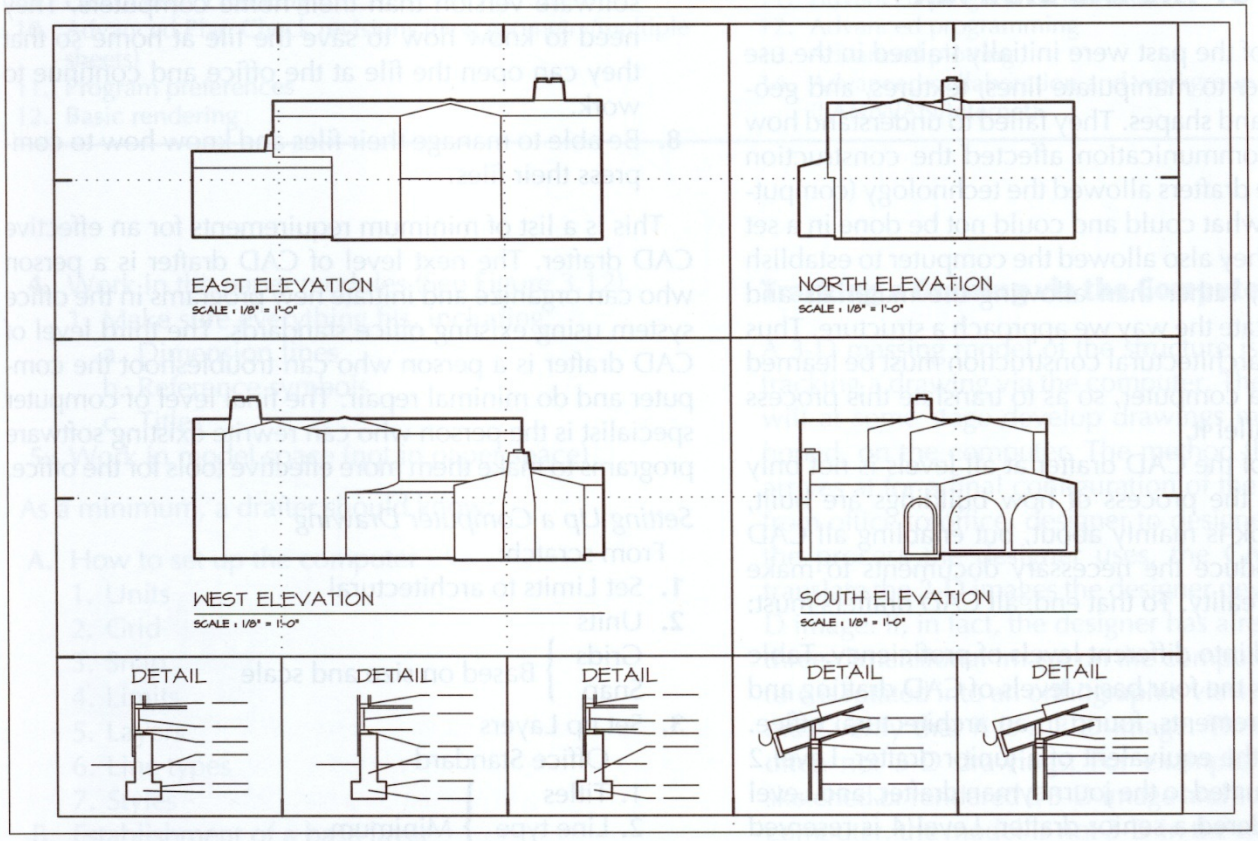
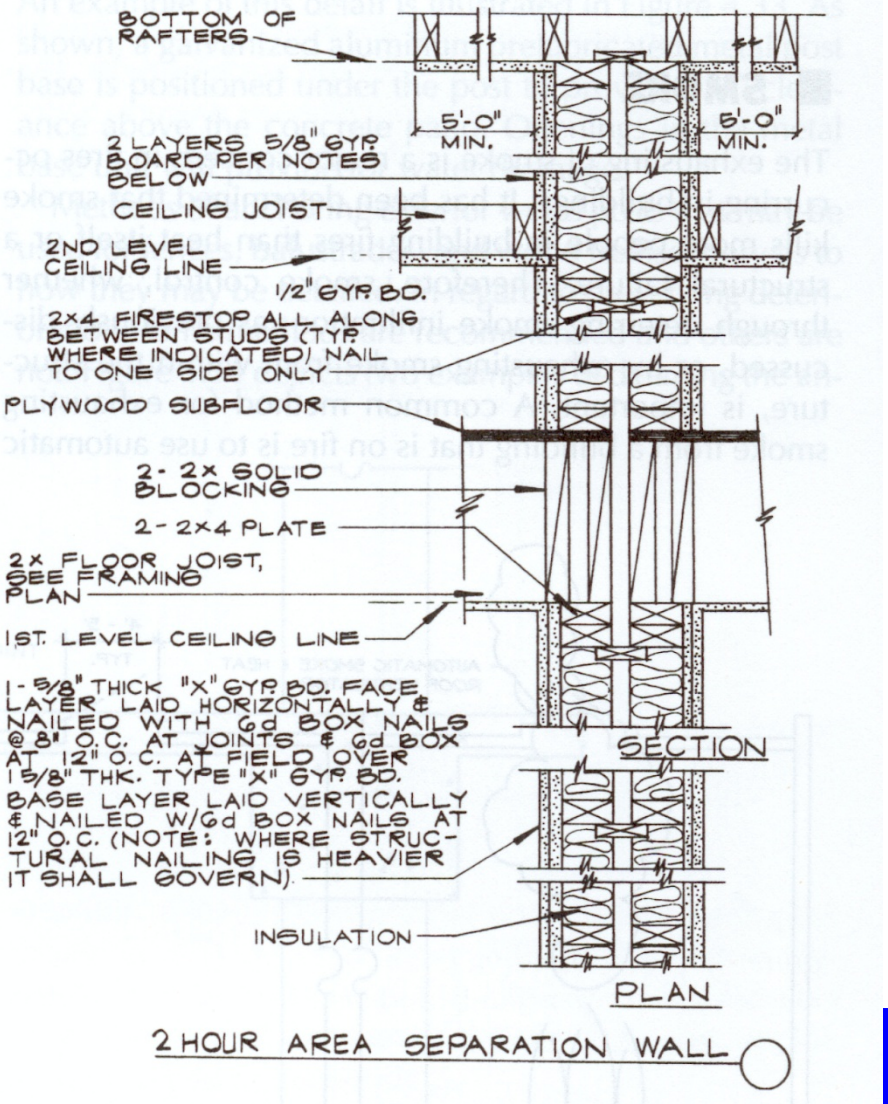


Figure 3.30 Sample cartoon/page layout. (Courtesy of Mike Adli, Owner; Nagy R. Bakhoum, President of Obelisk Architects.)

Before you do your final drawings, each page is roughed out to make sure things fit…

details



Information that cannot be drawn in the building section is drawn at a larger scale in detail drawings.

Basic rule, the larger the scale, the more information you are supposed to show.

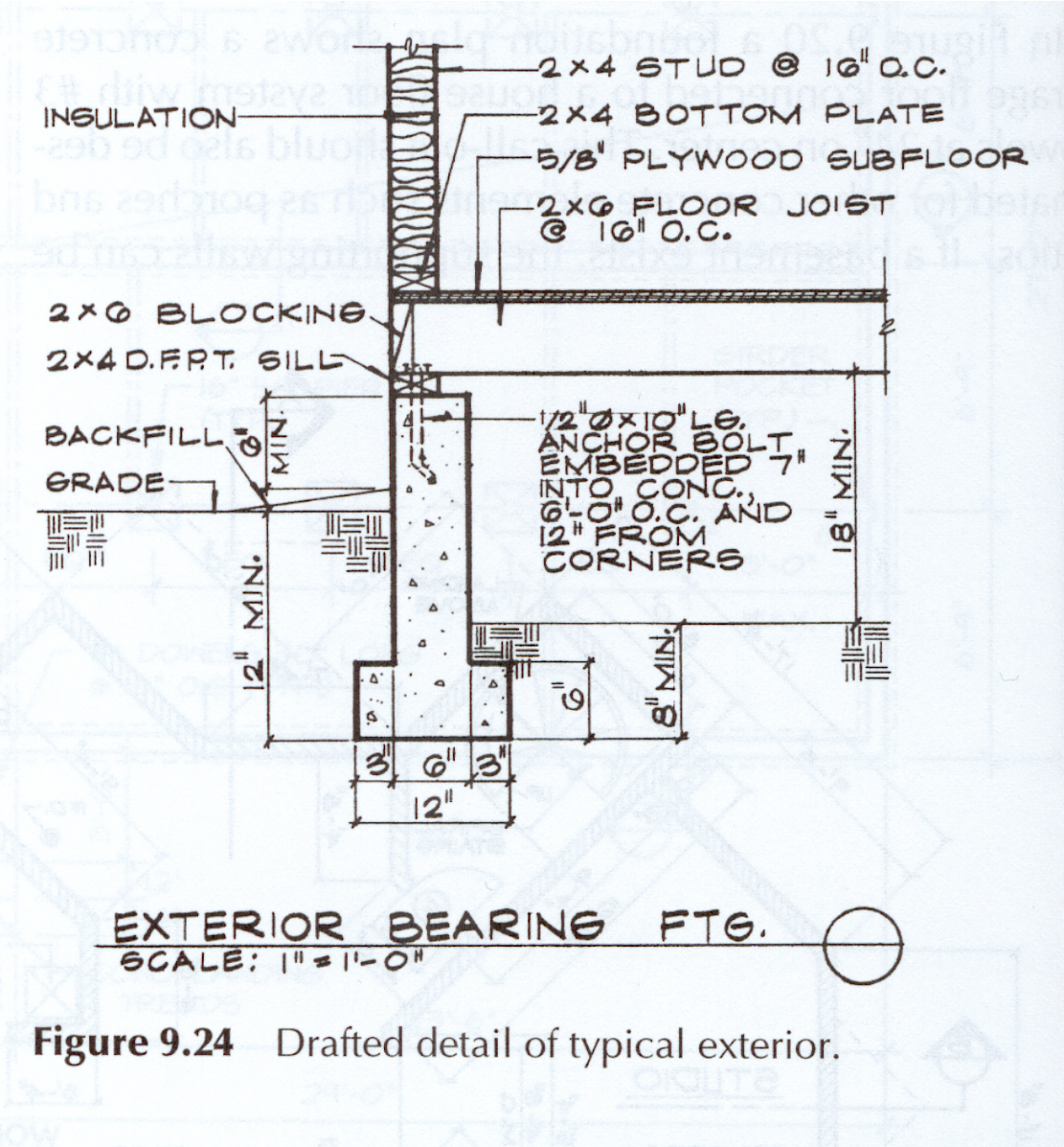


Figure 9.24 Drafted detail of typical exterior.

The large scale sections for the final project are to be drawn at 1:10 metric.

They should show all material layers.

Label EVERYTHING.

Note sizes and thicknesses.

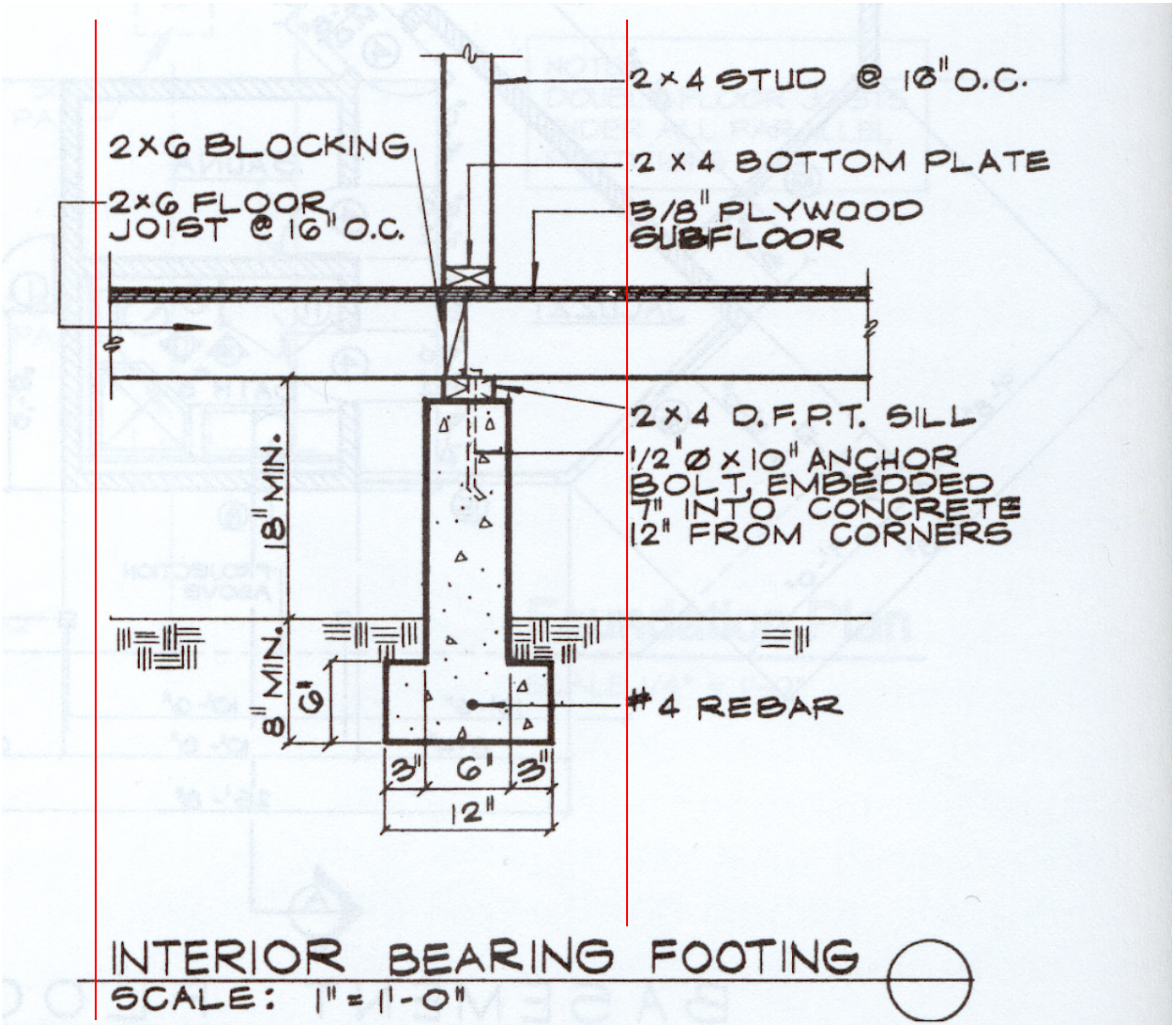


Figure 9.25 Drafted detail of interior bearing footing with wood floor.

Note how the labels are all lined up to make the drawing look organized…

Yes, neatness counts.

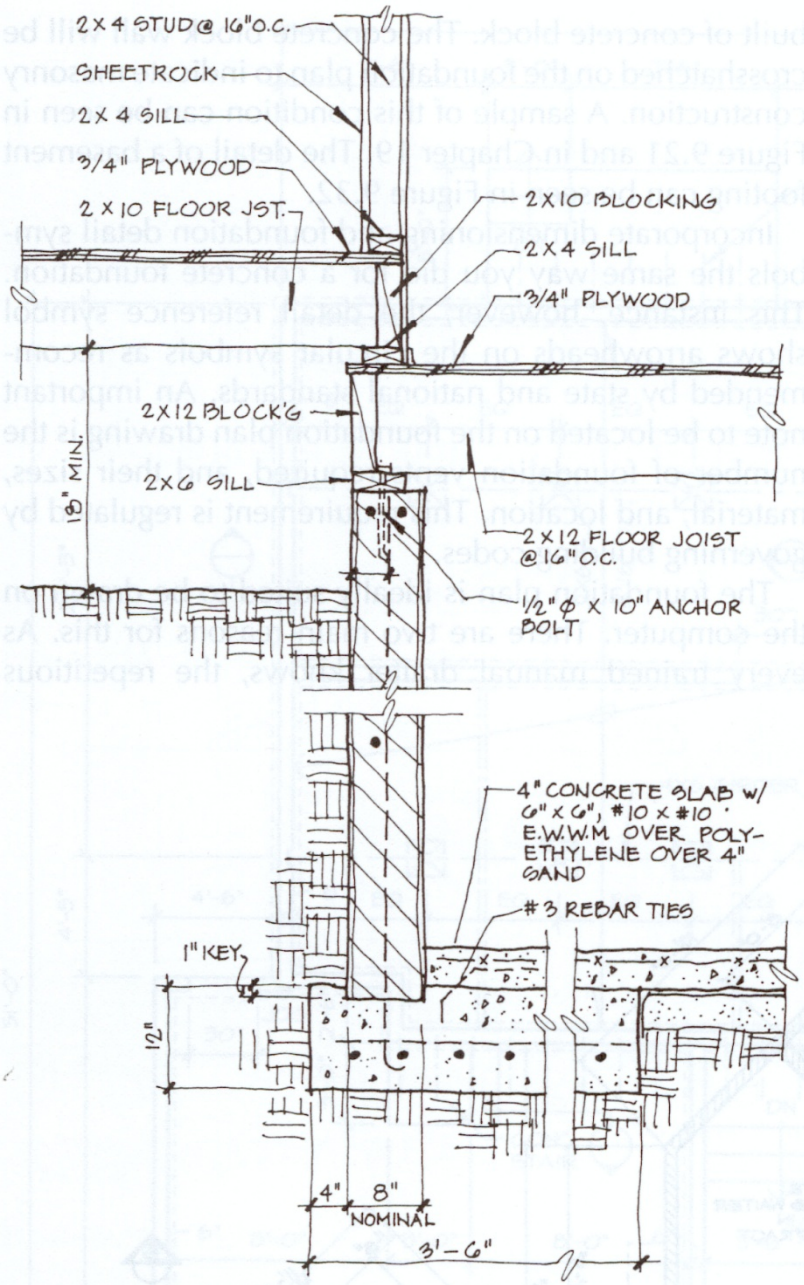


Figure 9.22 Concrete block wall and basement—wood floor.

This is a “sketch section”.

This is what you might rough out before you do the final drawing to see if things work.

This is also what I am expecting from your at desk test next week in terms of “style”.

keys

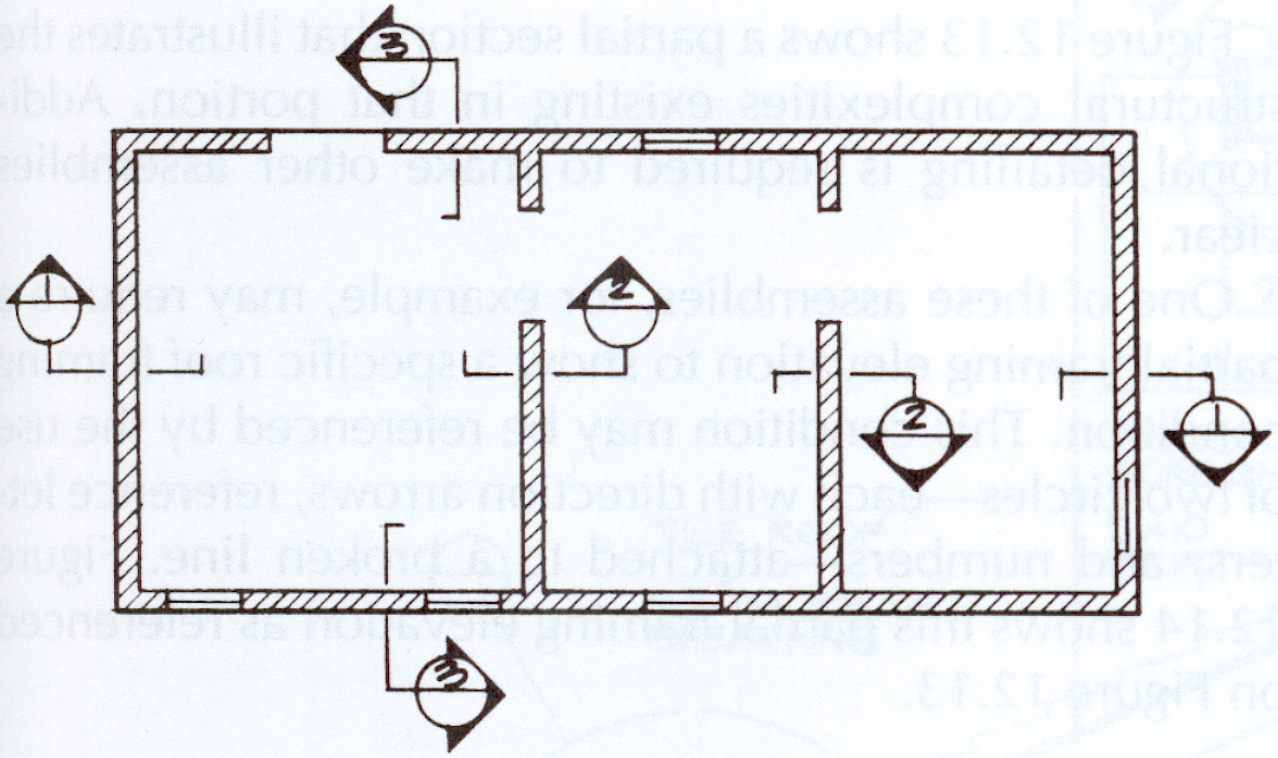


Figure 12.8 Floor plan—industrial building.

This is the plan key for the next set of drawings. It shows where the sections are cut.

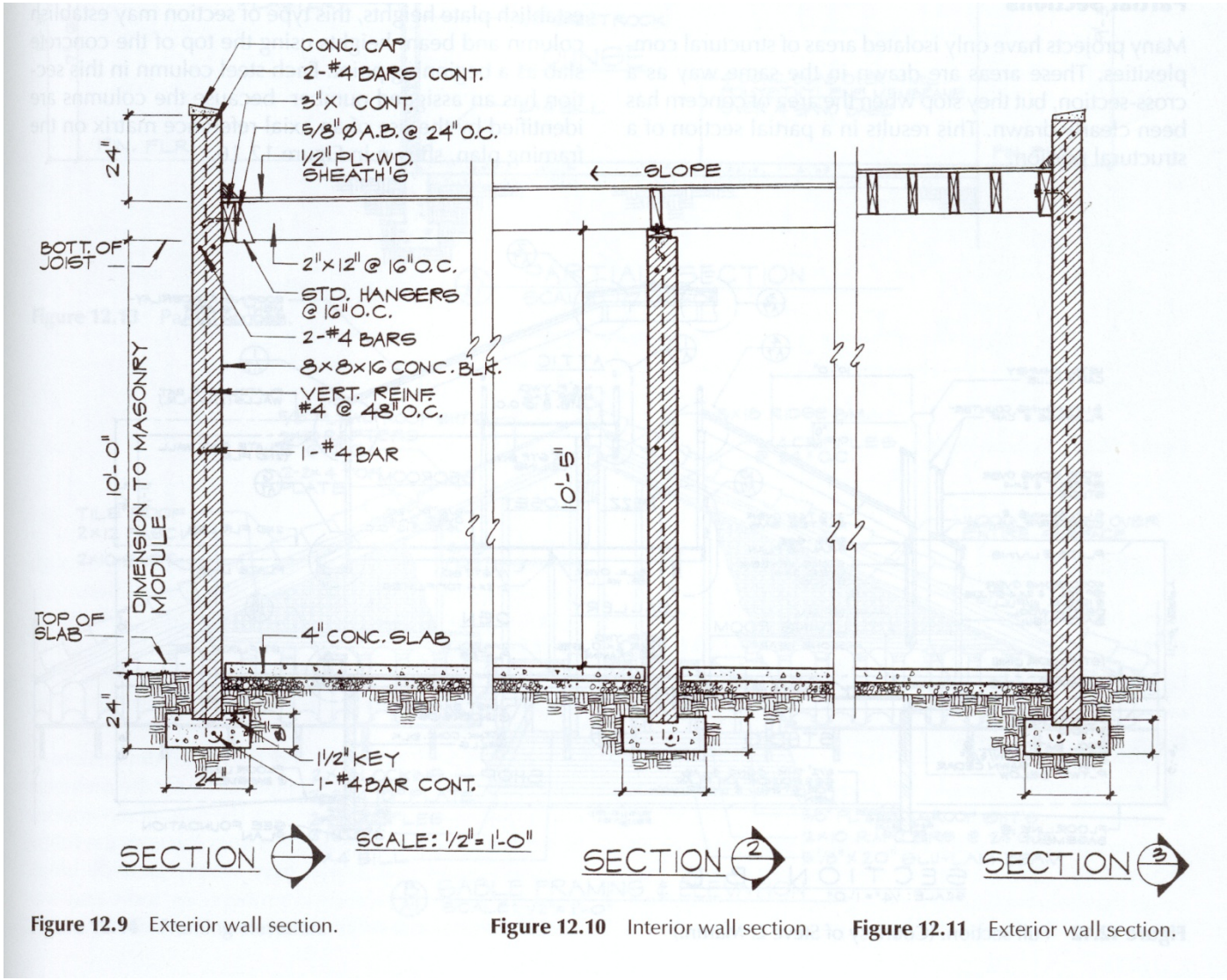


Figure 12.9 Exterior wall section.

Figure 12.10 Interior wall section.

Figure 12.11 Exterior wall section.

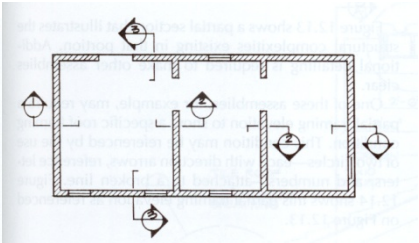
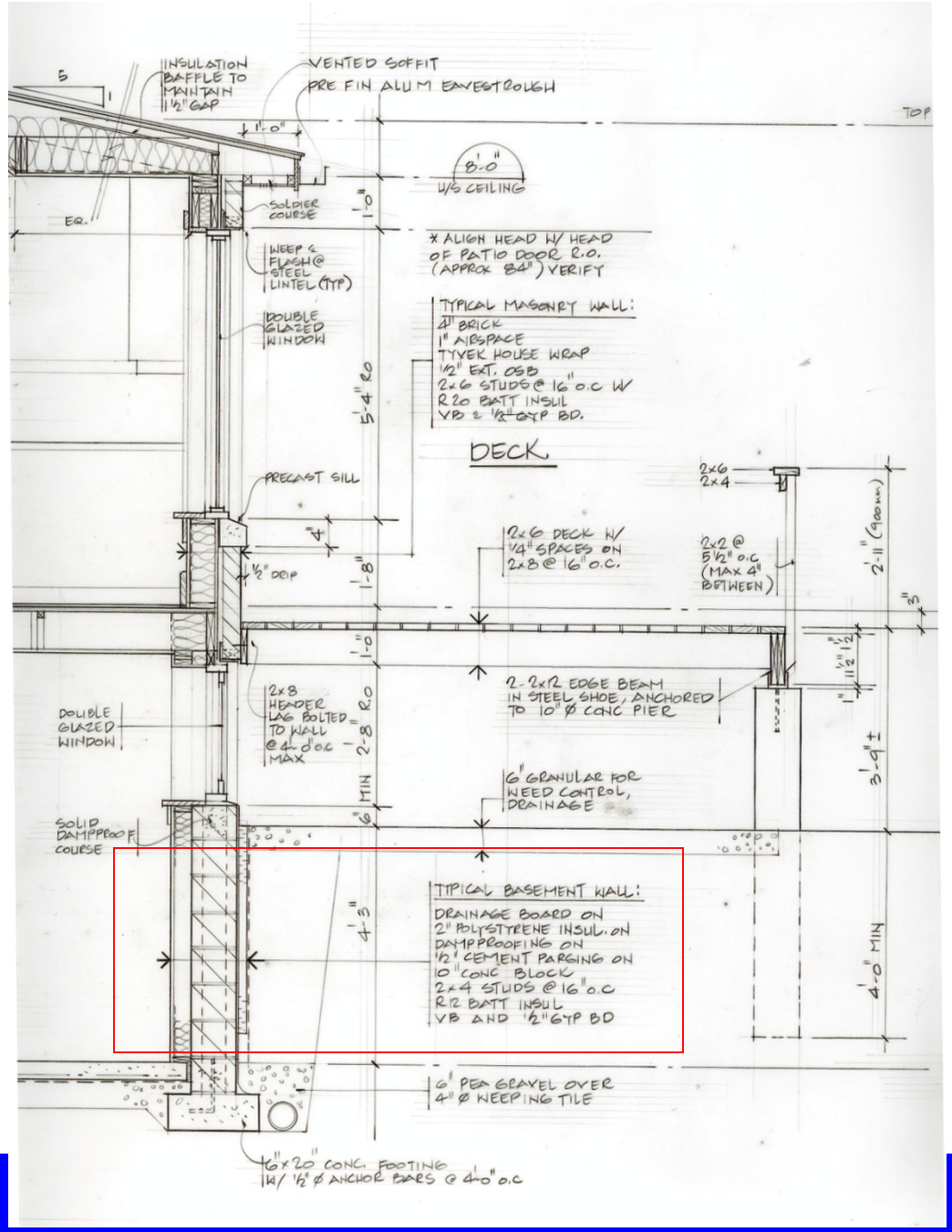


Figure 12.8 Floor plan—industrial building.

When we put multiple sections on a drawing we usually make them “line up” so that we can take advantage of overriding height dimensions.

Also adds overall clarity.

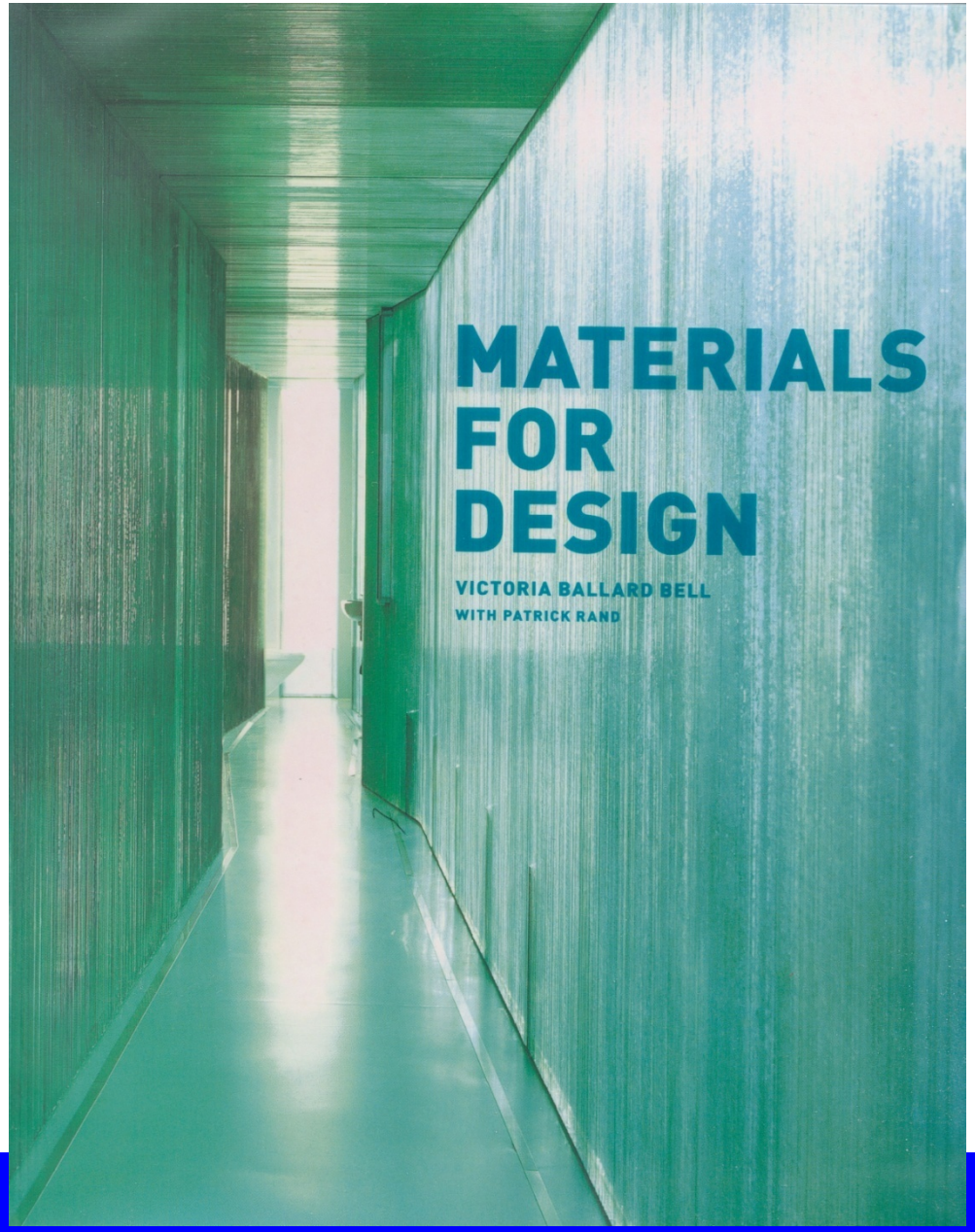


This is an actual contract document detailed section that illustrates my preferred method of “ganging” the notes for each “assembly”.

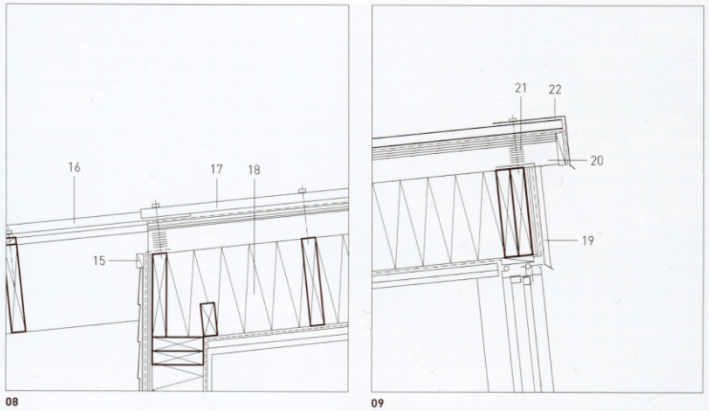
This prevents a veritable spiderweb of arrows criss crossing all over the drawing noting materials.

It also allows the contractor to know the general makeup of key building elements.

"inbetween" Drawings

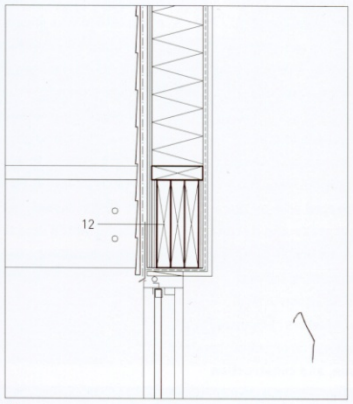


05 Through court-view to southwest
06 Interior
07 Entry
08 Roof assembly
09 Eave assembly
10 Wall/window assembly
11 Floor/wall assembly
12 Exterior wall assembly
13 Exterior wall assembly

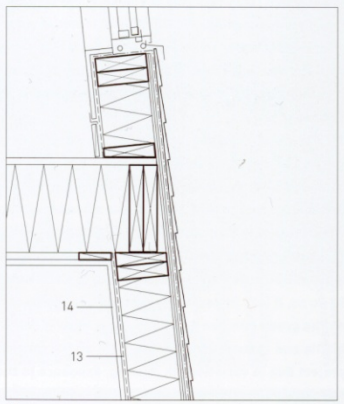


08

09

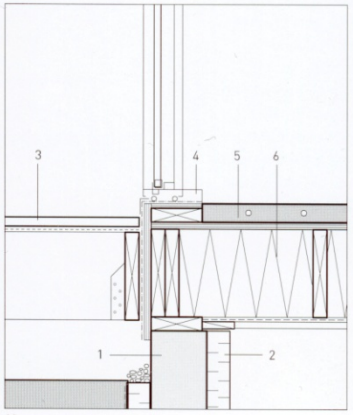


10

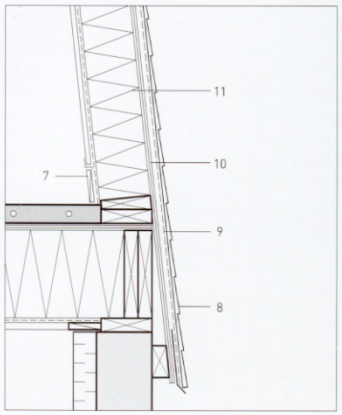


11

1. 6 in. (15.2 cm) reinforced concrete wall
2. 2.5 in. (6.35 cm) rigid insulation
3. 1x6 spruce deckboard
4. Aluminum window system
5. 2 in. (5.08 cm) concrete topping with infloor radiant heating
6. R30 batt insulation
7. Paint grade MDF baseboard
8. Eastern White Cedar shingles (4 in. (10.16 cm) to the weather)
9. Asphalt building paper
10. .5 in. (12.7 mm) plywood sheathing
11. 2x6 exterior stud wall with R20 batt insulation
12. 3-2x10 window header
13. 6 mil vapour barrier
14. .5 in. (12.7 mm) drywall
15. 1 x 1.5 in. (2.5 x 3.8 cm) cedar blocking
16. Corrugated plastic roofing
17. Corrugated steel roofing
18. 2x3 vent strapping on 2x10 roof joists with R40 batt insulation
19. Custom metal flashing
20. Eave vent
21. Perforated venting strip
22. Galvanized metal flashing



12



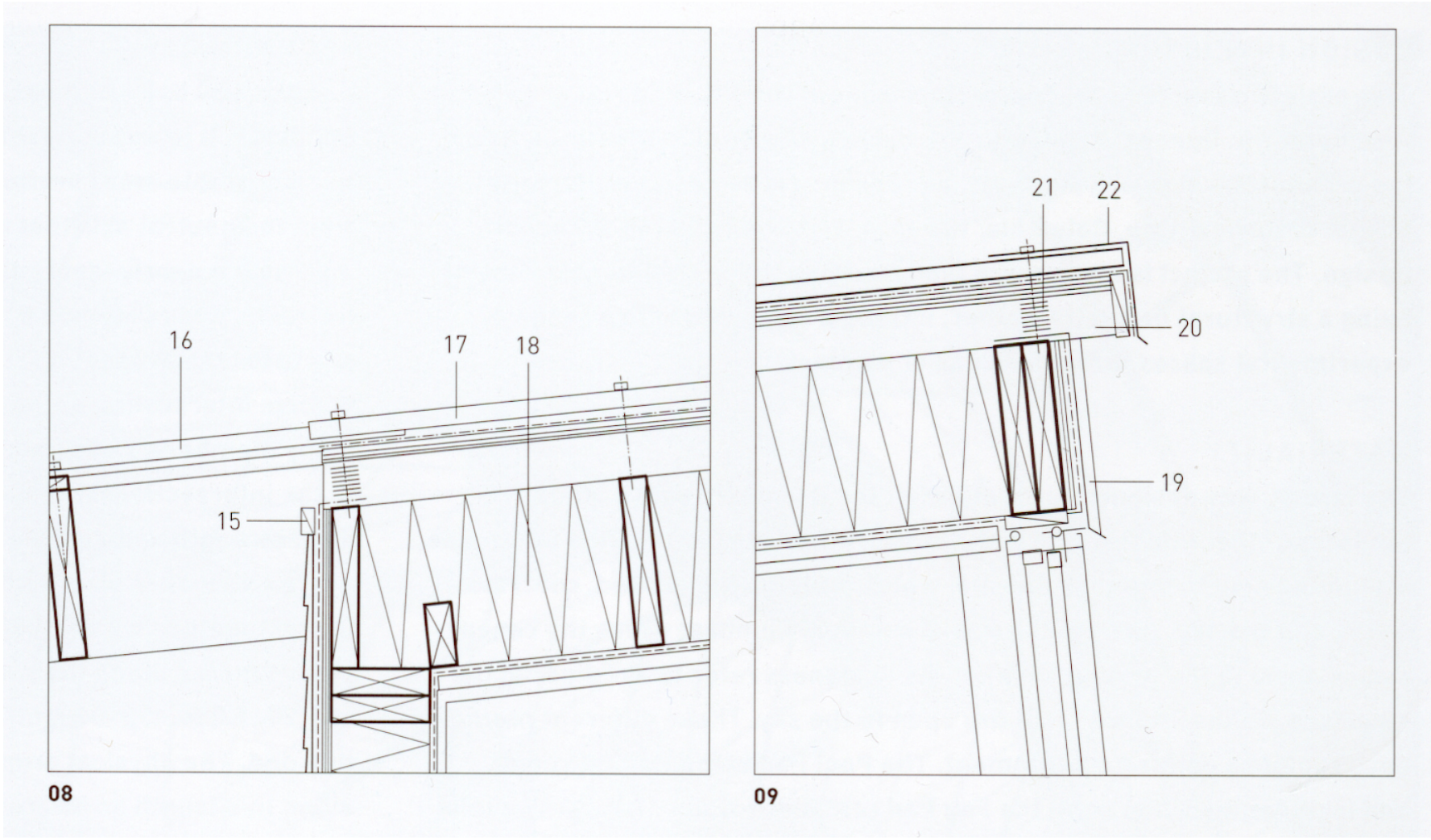
13

Brian McKay-Lyons Architect

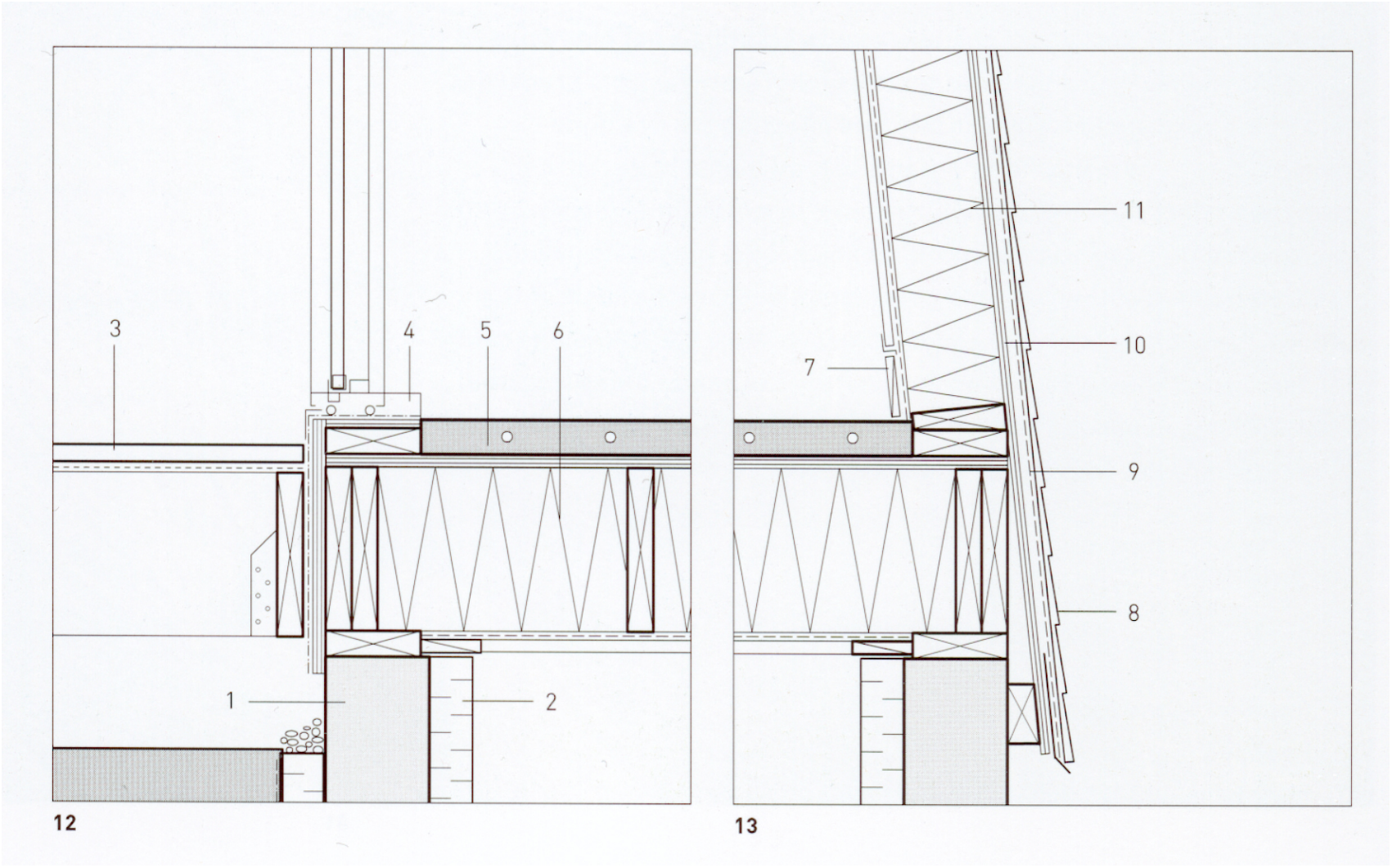
Messenger House II

Detail sections

Note how the overall building shape and continuity is inferred by the placement of the sections within rectangles, that line up, even though the content is “broken”.

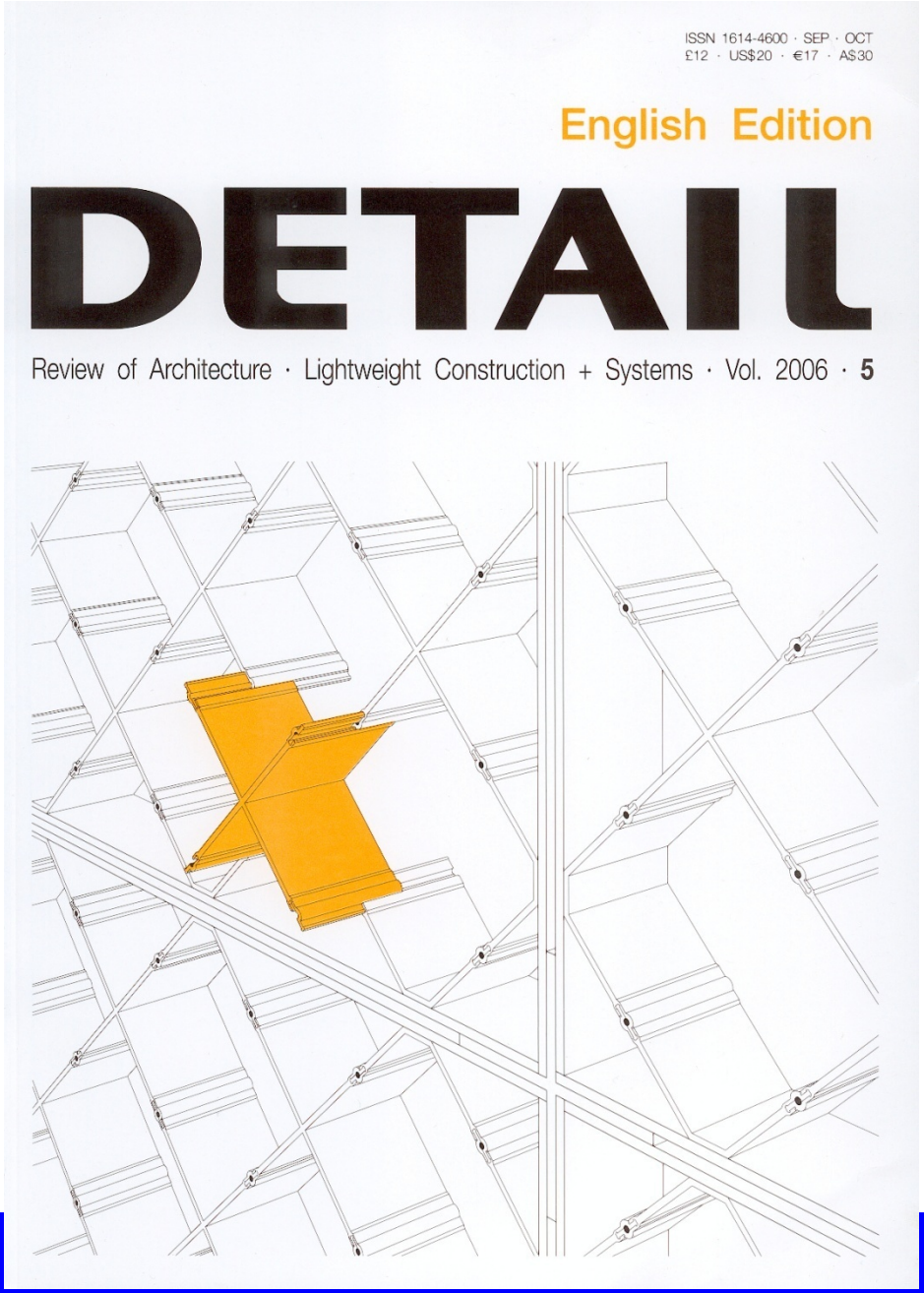


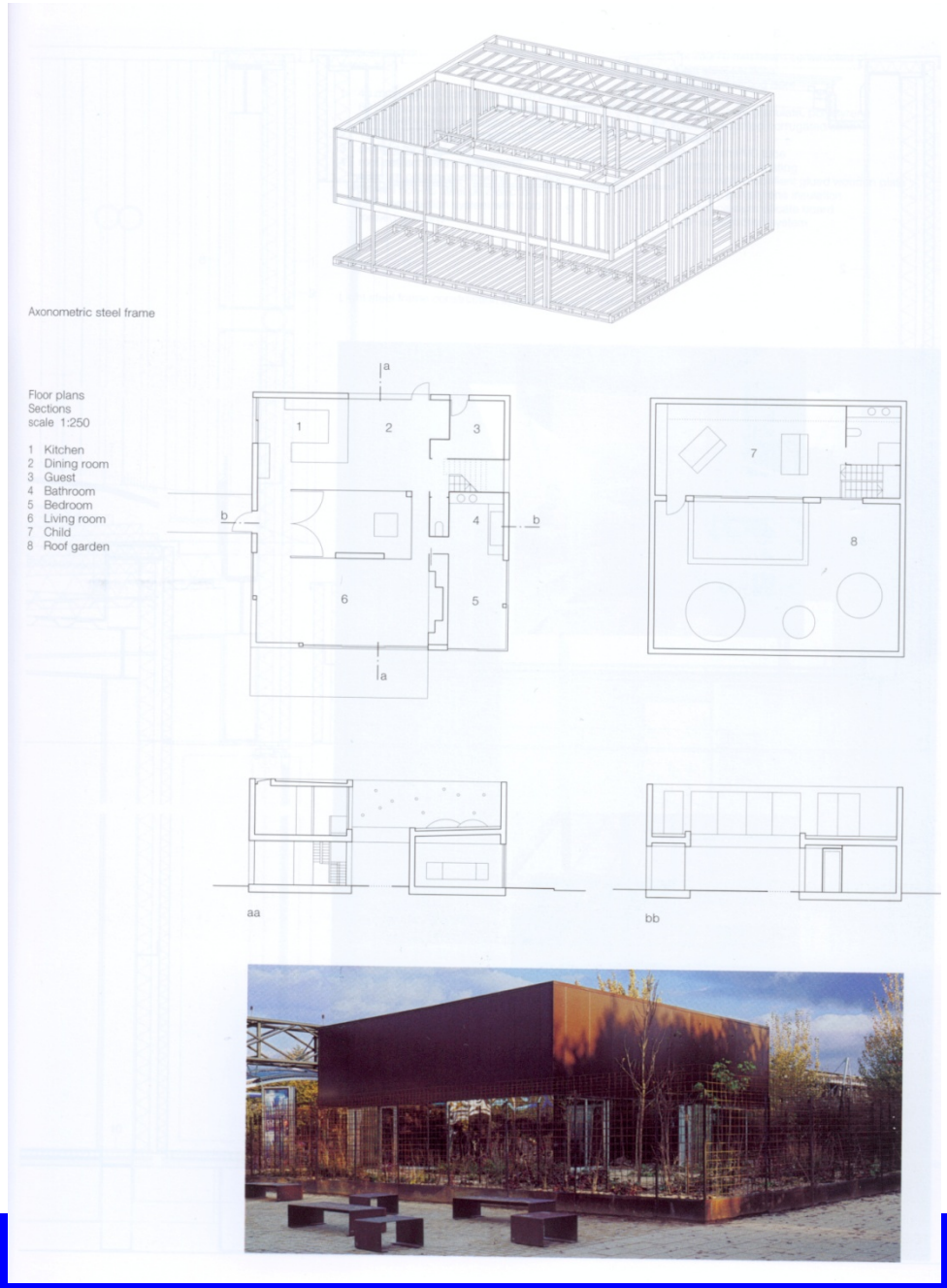
Dimension lumber is shown with an X through the middle to indicate it is structural. Not how confusing the numbering system is…



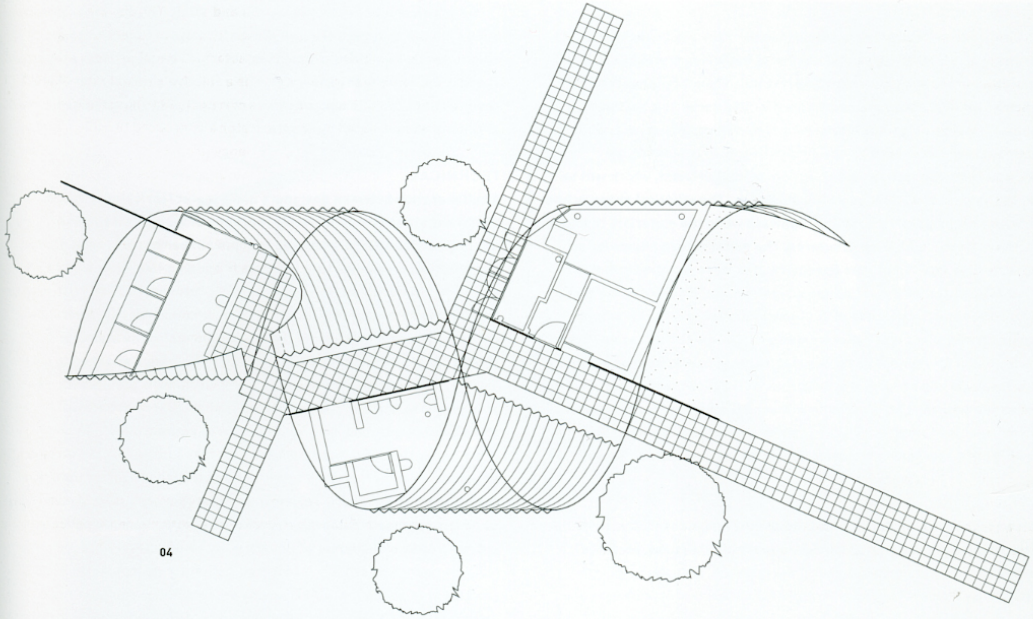
Batt insulation is shown as a series of light diagonals rather than the curvy hatching that is often seen on construction documents.

“inbetween” Drawings





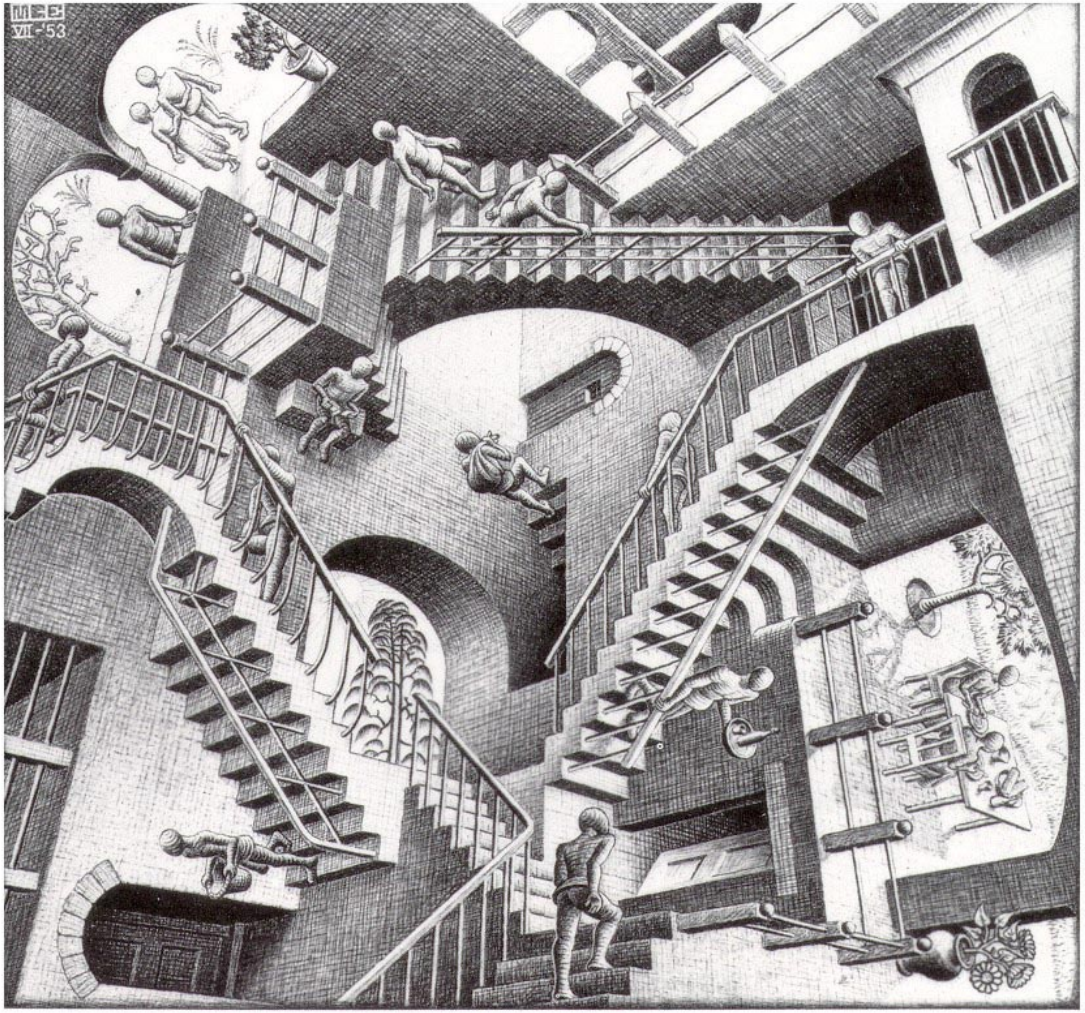
Books are often good places to look to suggest the layout for a single page of drawings.

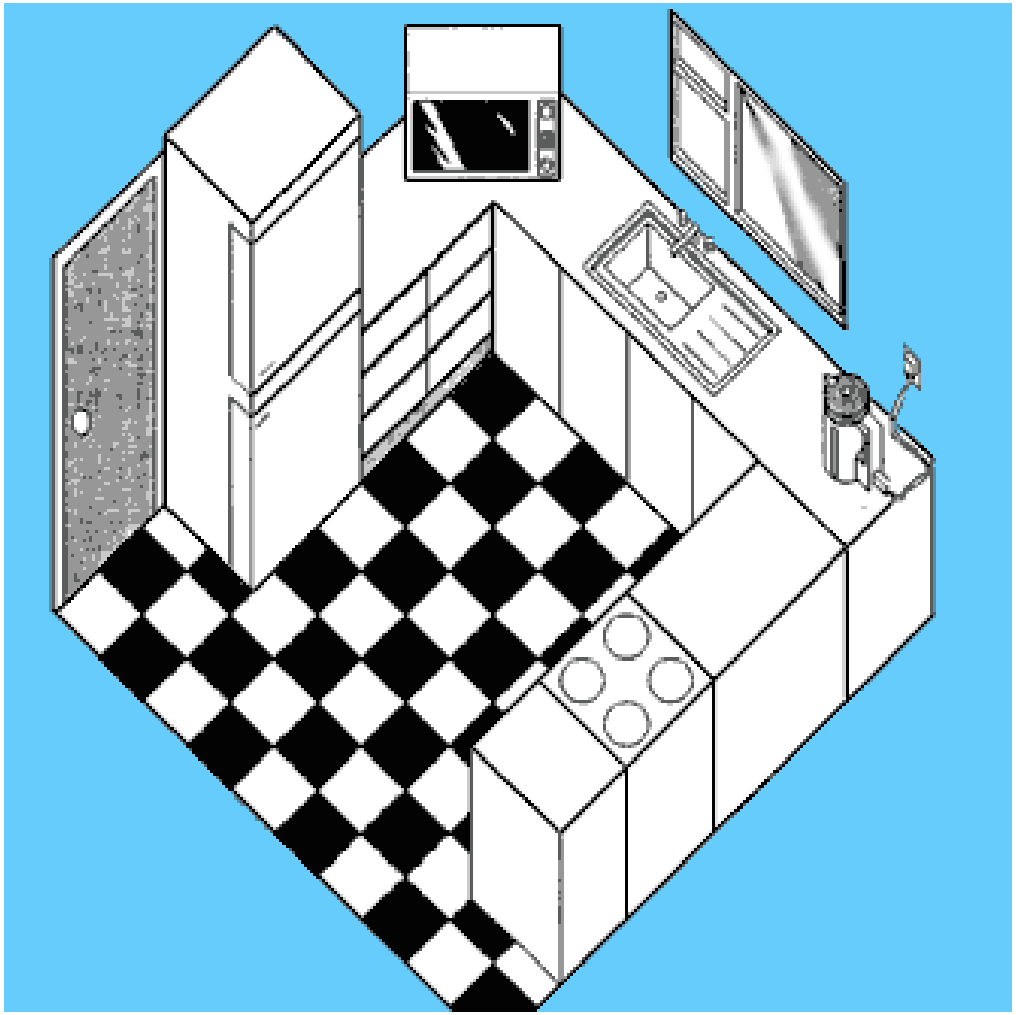


04

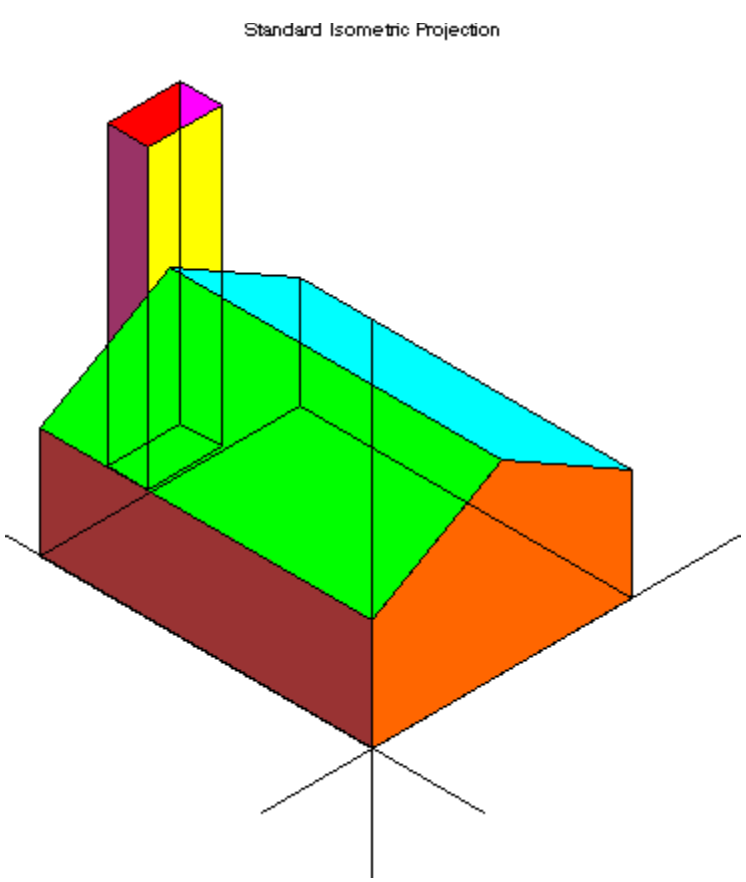
05

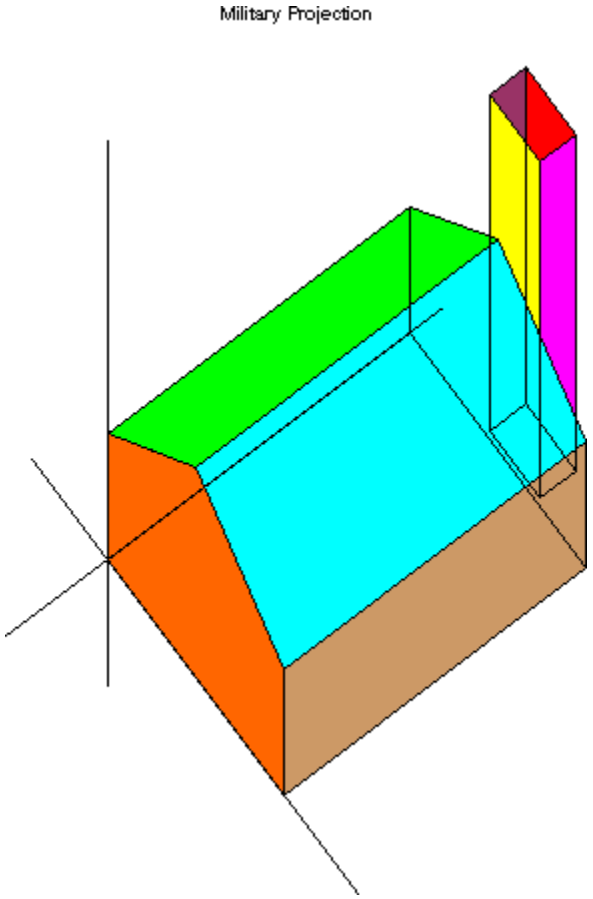
3D drawings





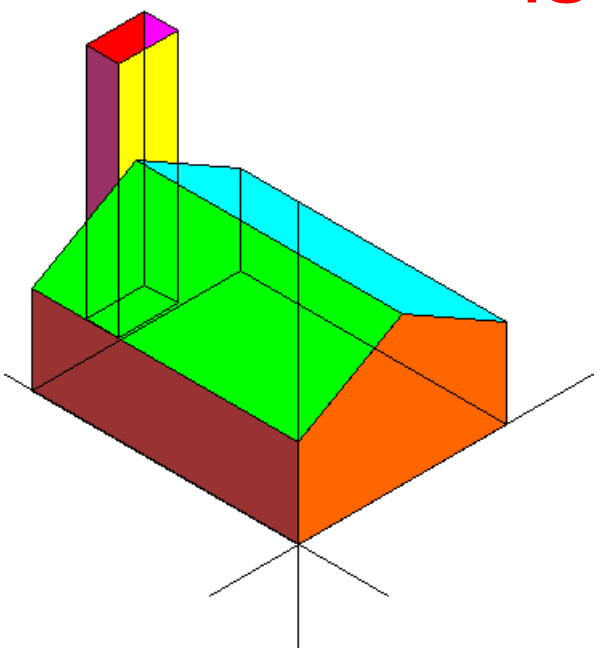
iso versus axo

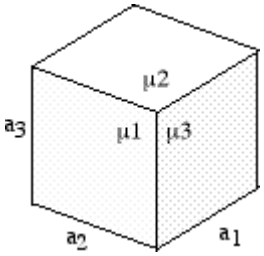




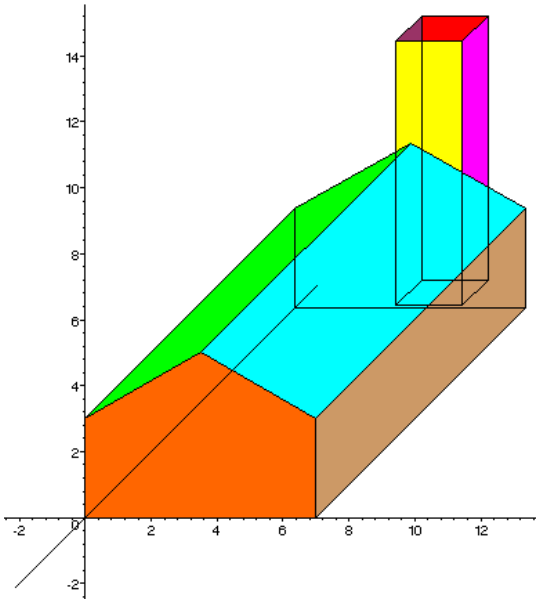
iso versus axo

Standard Isometric Projection

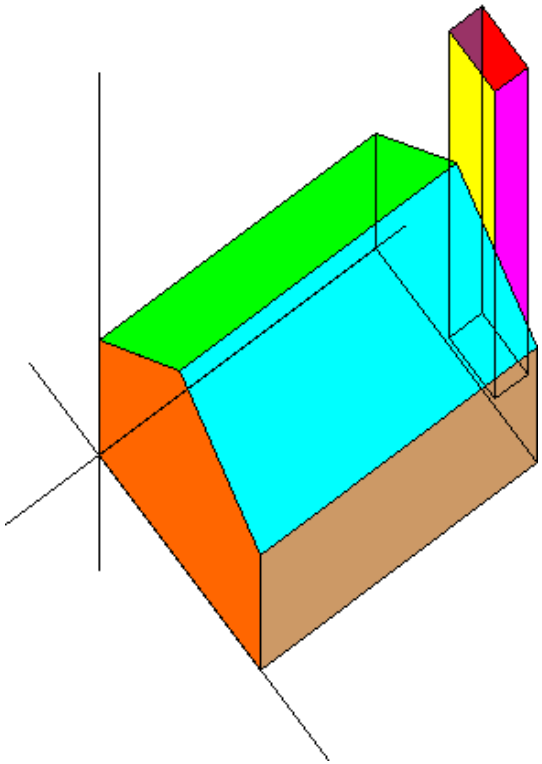




Oblique Projection



Military Projection



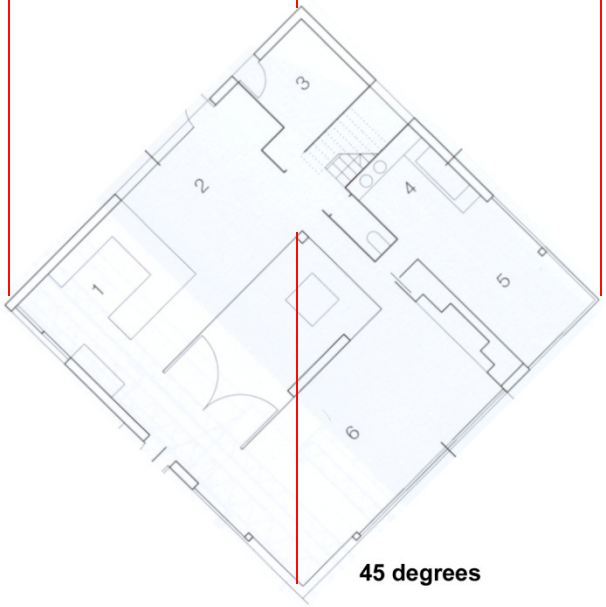
Vertical dimensions are all actual.

60 degrees

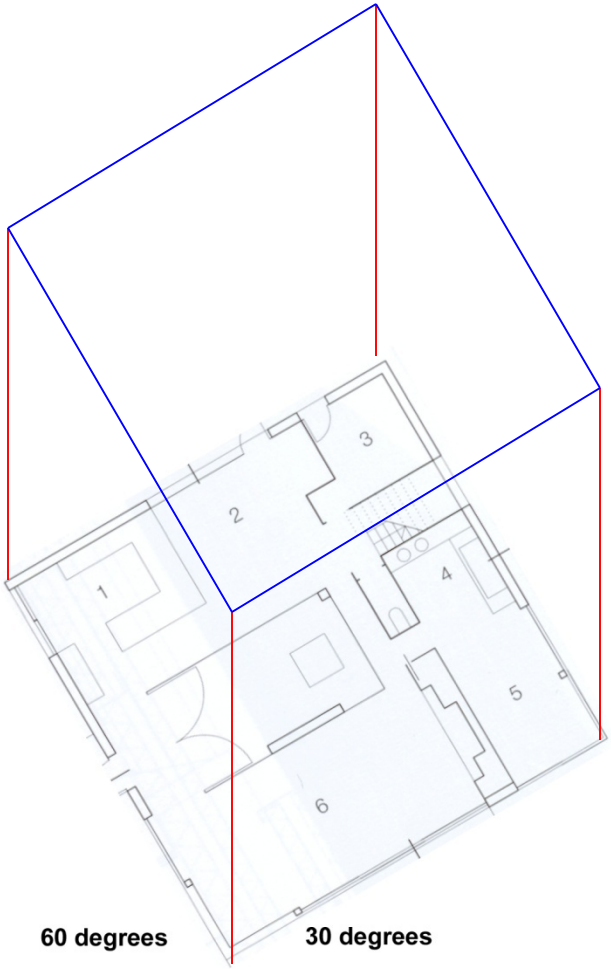
30 degrees

Take your plan and decide if it is best to rotate 30 or 60 degrees.

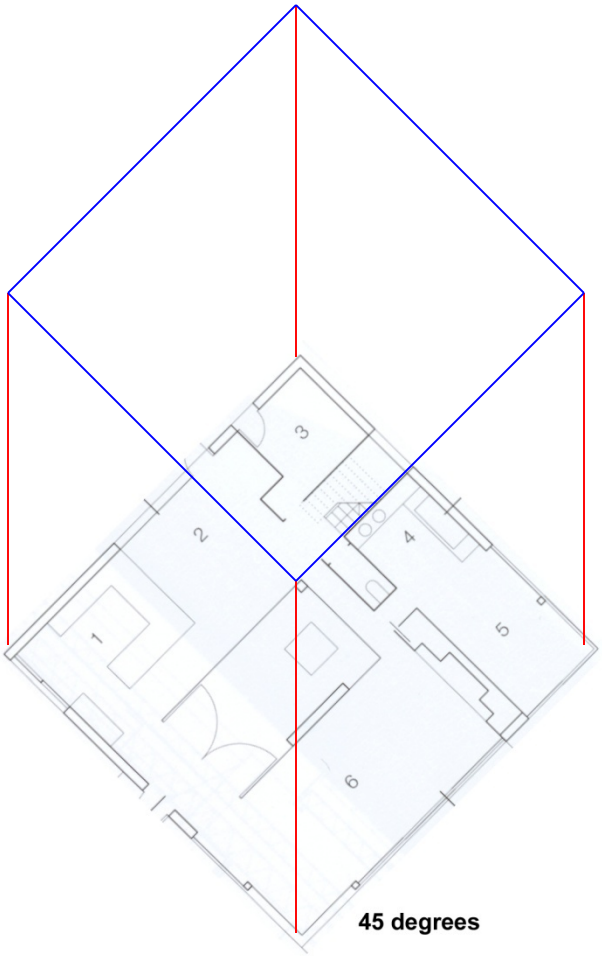
Add your vertical lines.

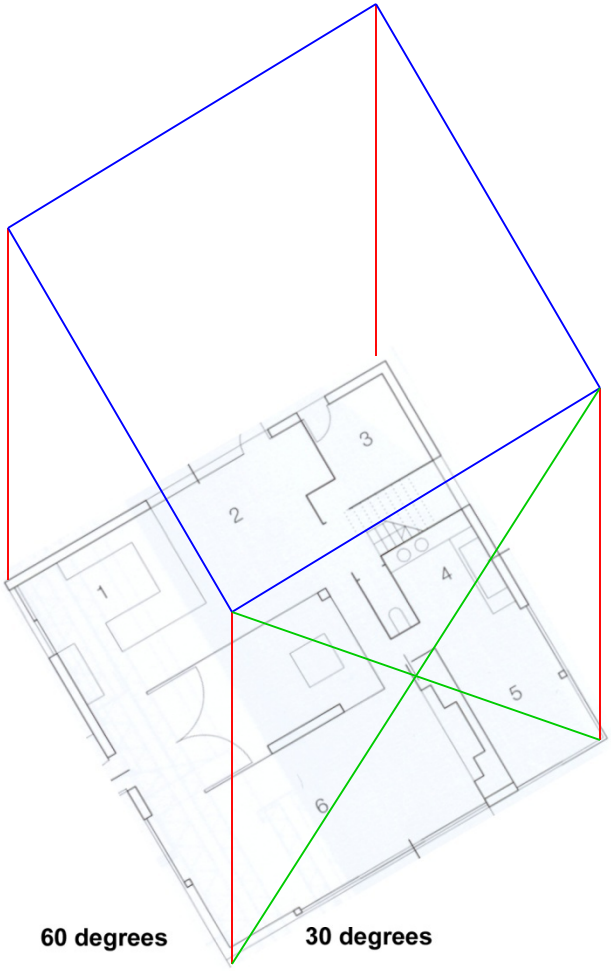


45 degrees



Add horizontal lines. They are also “to scale”.

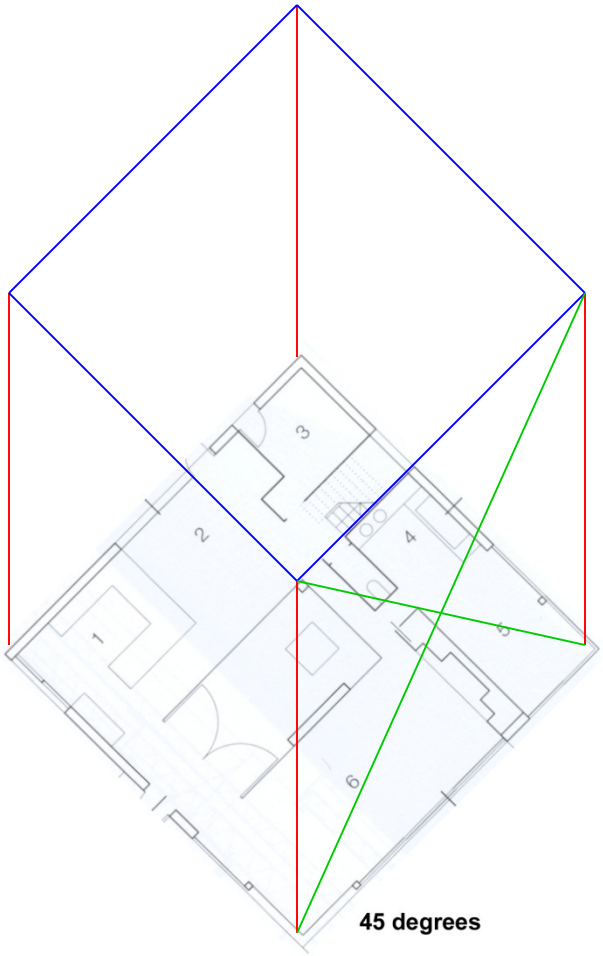




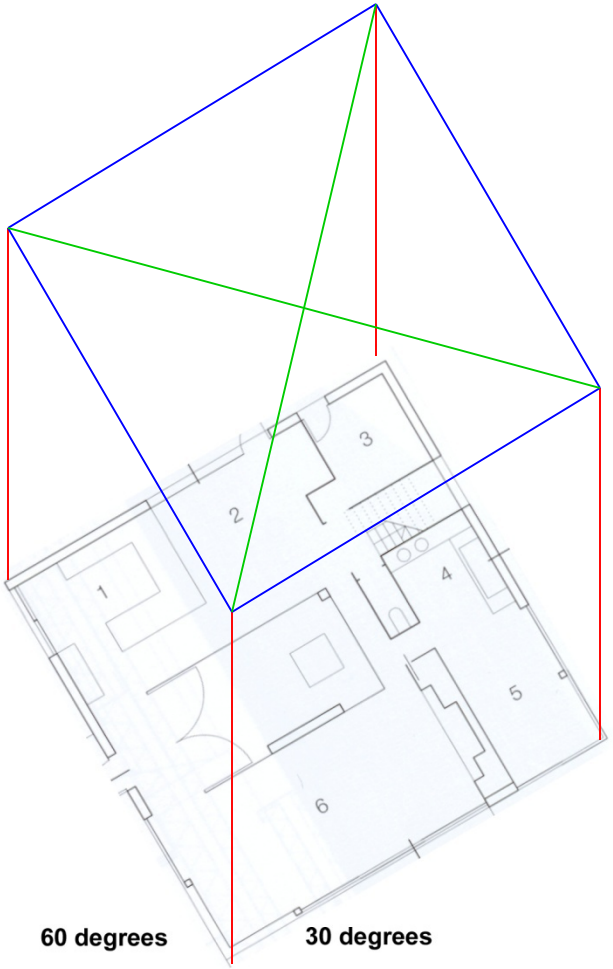
60 degrees 30 degrees

Add horizontal lines. They are also “to scale”.

Diagonal lines on the planes of the walls are NOT to scale.

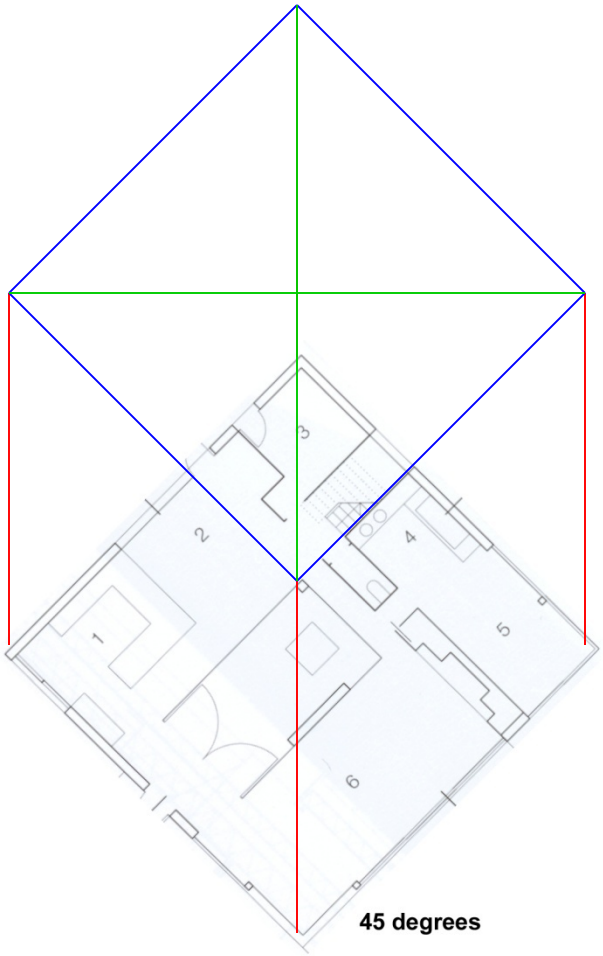


45 degrees

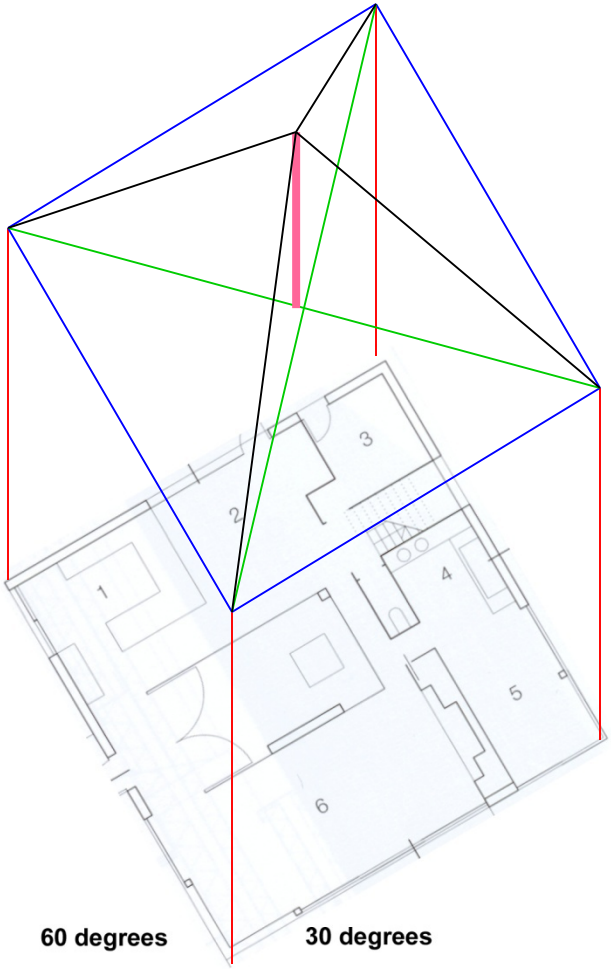


60 degrees 30 degrees

To make a pitched roof, draw the diagonals across your roof plane.



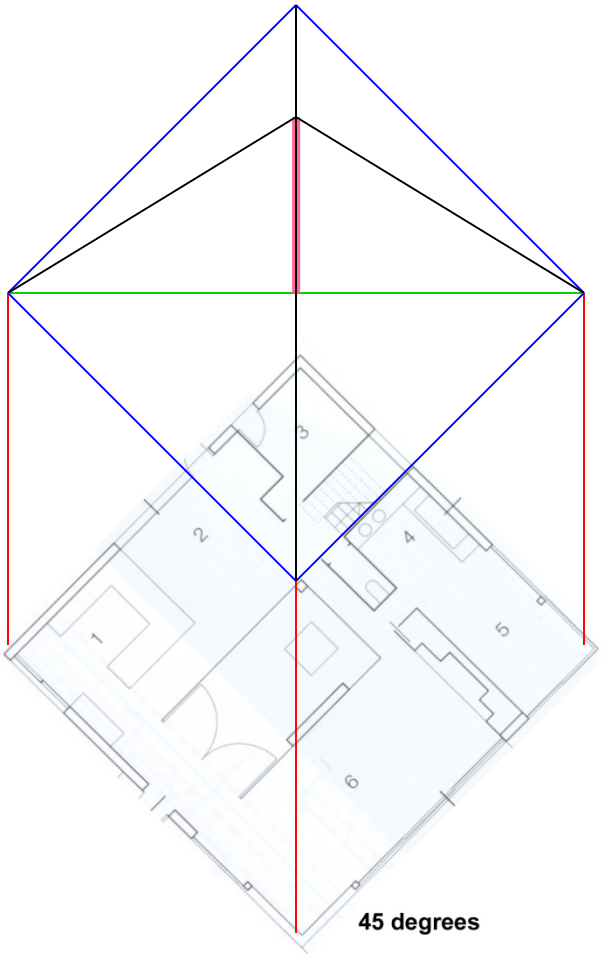
45 degrees



Draw in the vertical dimension to the top of the roof. This is a scaleable dimension.

Then finish with the ridges.

There are issues with the 45 degree image with overlap.



3-D construction drawings

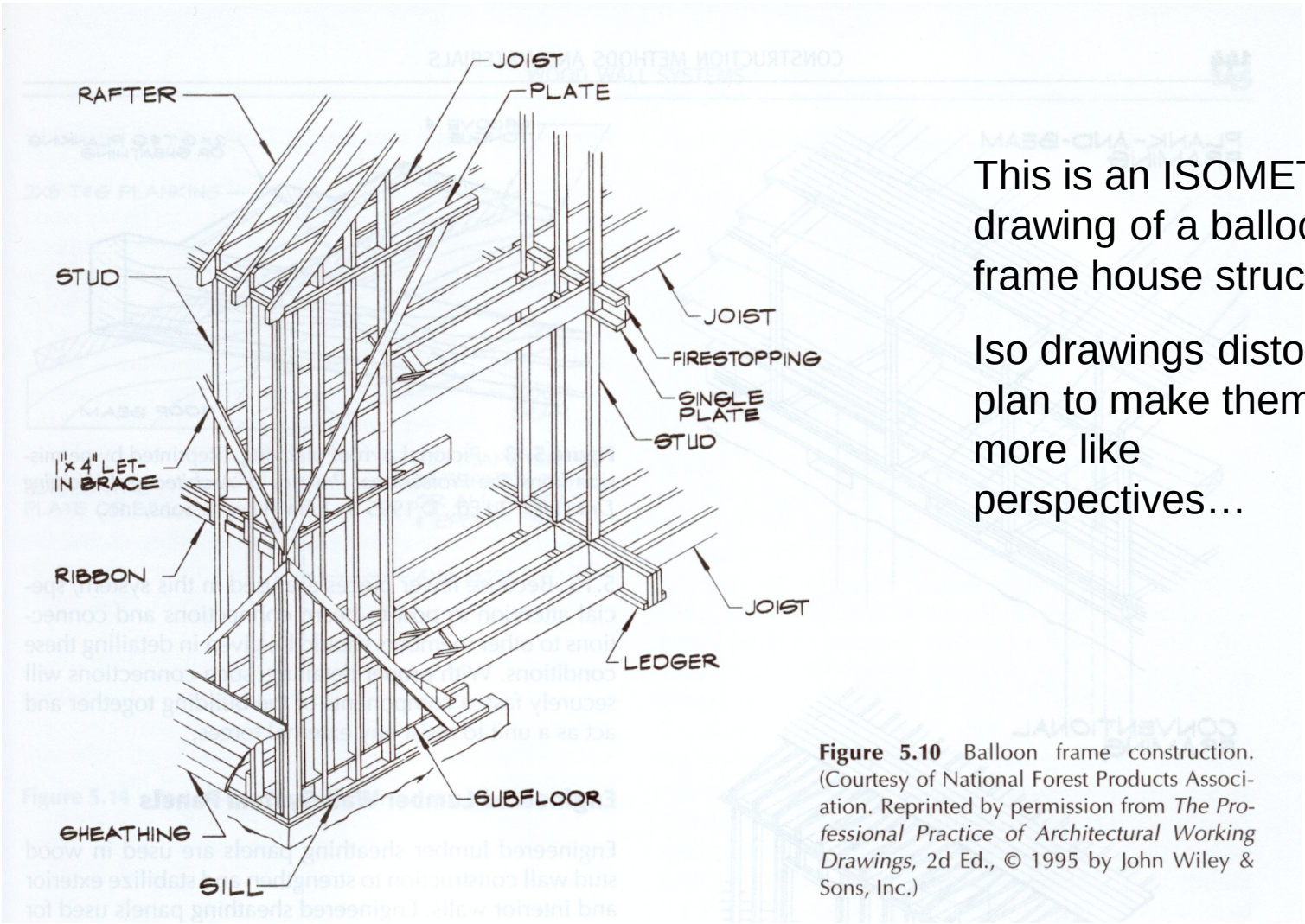
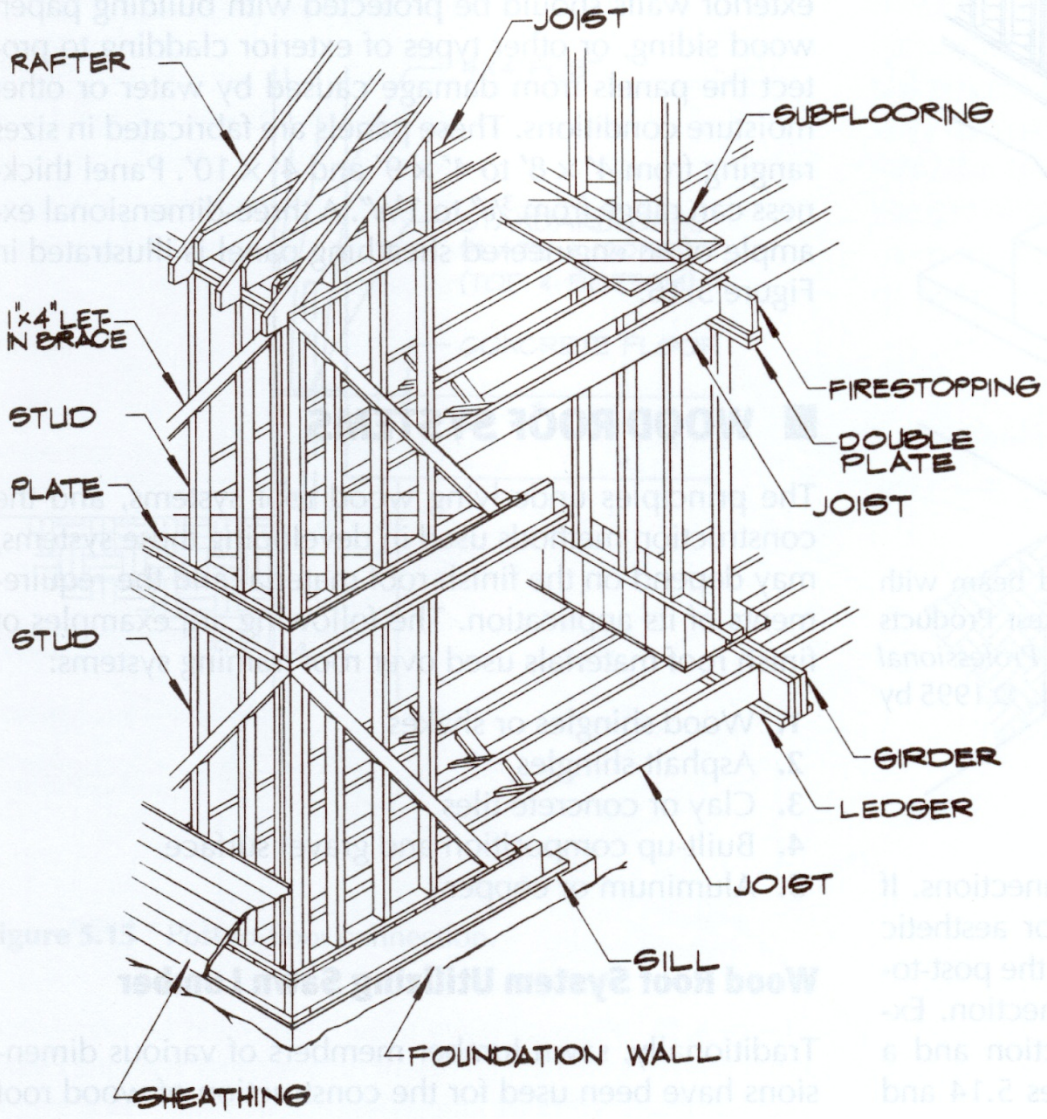


Figure 5.10 Balloon frame construction. (Courtesy of National Forest Products Association. Reprinted by permission from *The Professional Practice of Architectural Working Drawings*, 2d Ed., © 1995 by John Wiley & Sons, Inc.)

This is an ISOMETRIC drawing of a balloon frame house structure.

Iso drawings distort the plan to make them look more like perspectives…



This is an ISOMETRIC drawing of a platform frame structure.

This is somewhat like the drawings I am expecting for your final project except that I want an AXONOMETRIC.

Note the labels!

Figure 5.11 Western or platform framing. (Courtesy of National Forest Products Association. Reprinted by permission from *The Professional Practice of Architectural Working Drawings*, 2d Ed., © 1995 by John Wiley & Sons, Inc.)

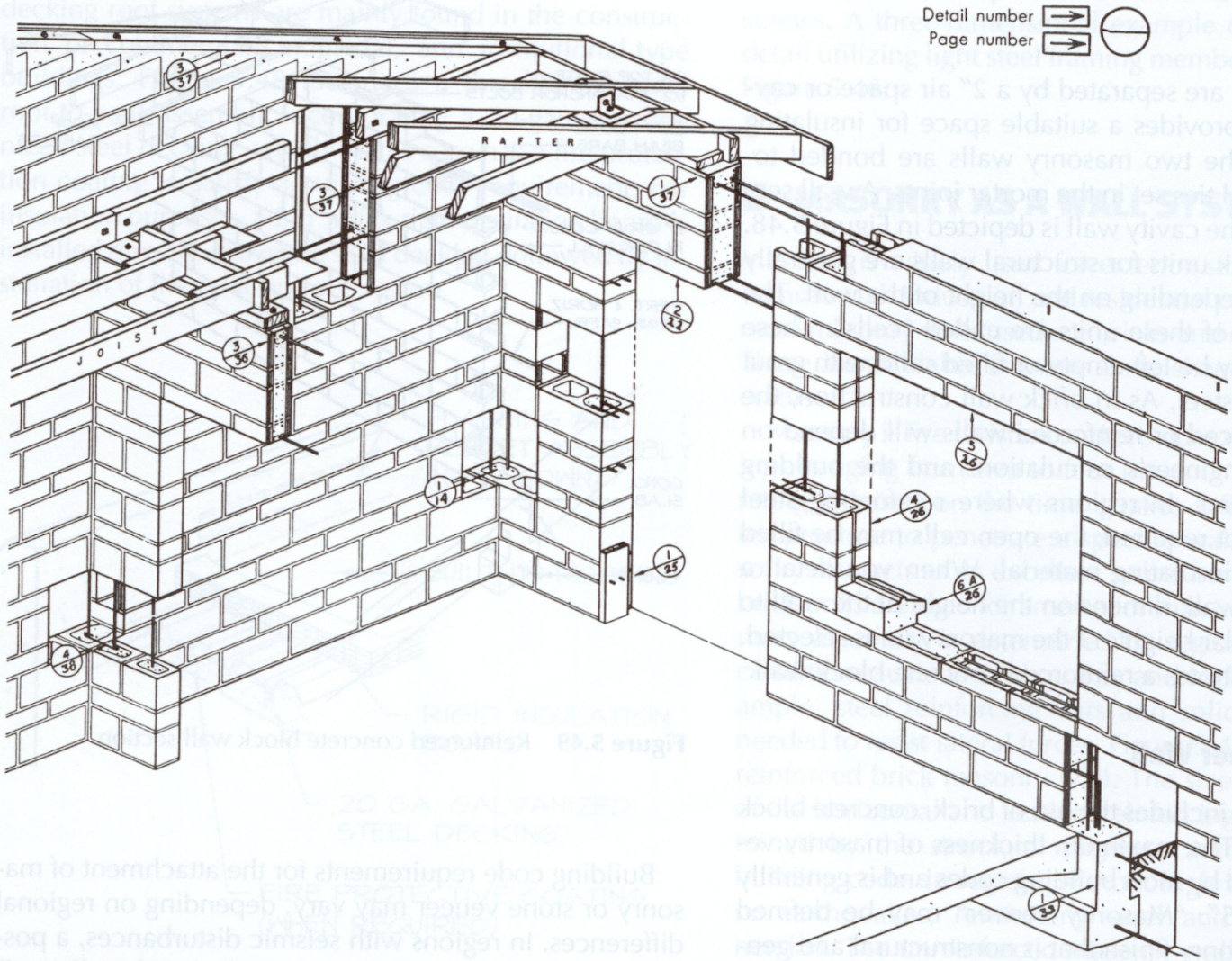


Figure 5.51 Typical concrete block residential construction. (Reprinted by permission from *Professional Practice of Architectural Detailing*, 3d Ed., © 1999 by John Wiley & Sons, Inc.)

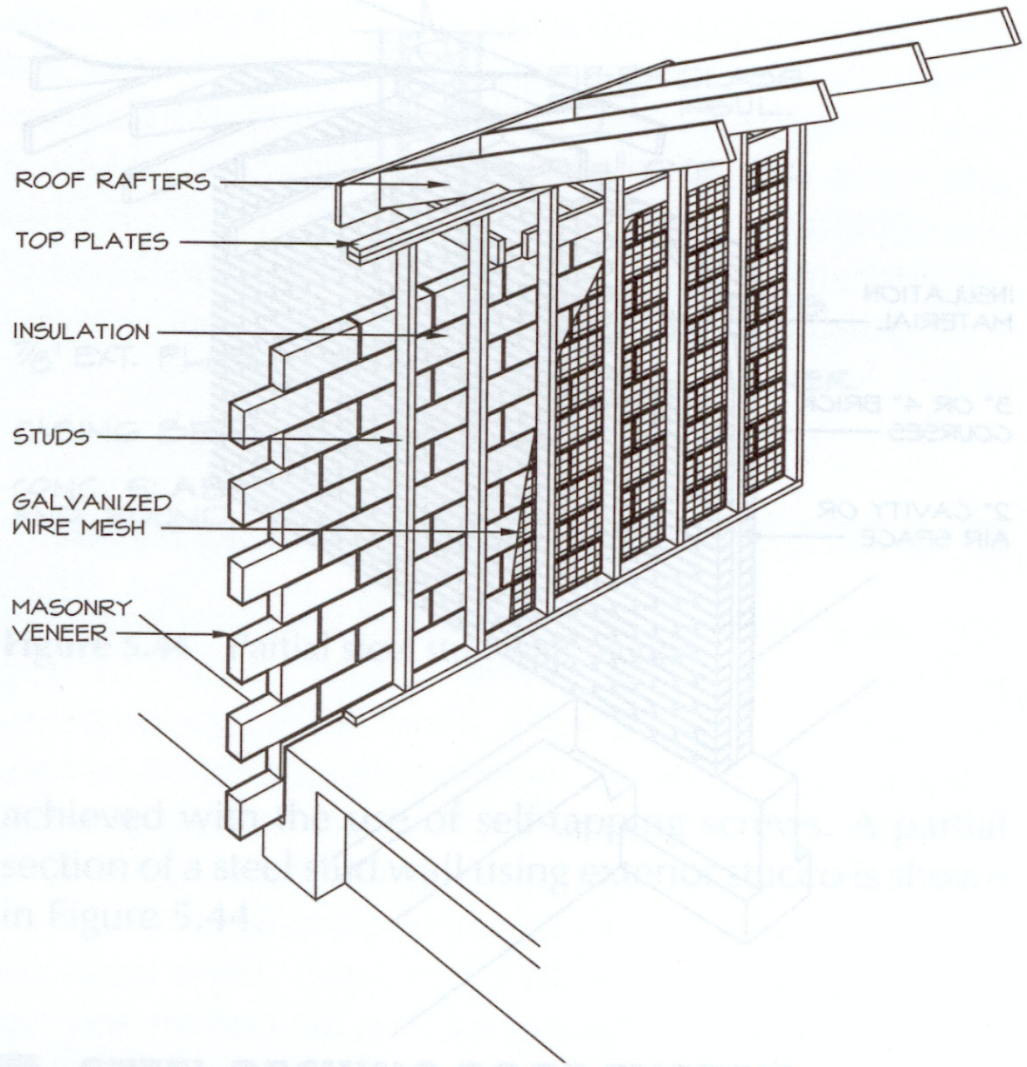
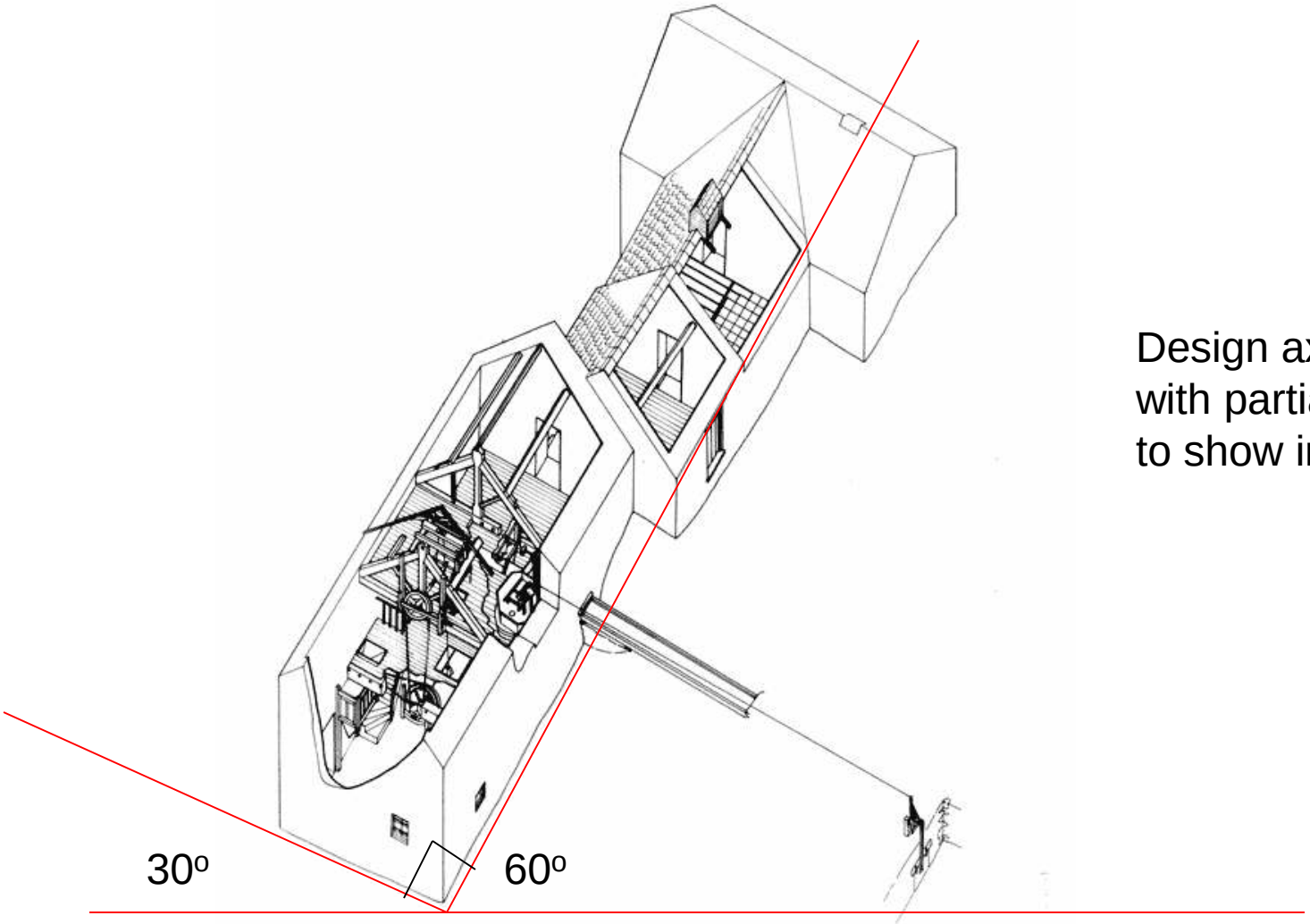


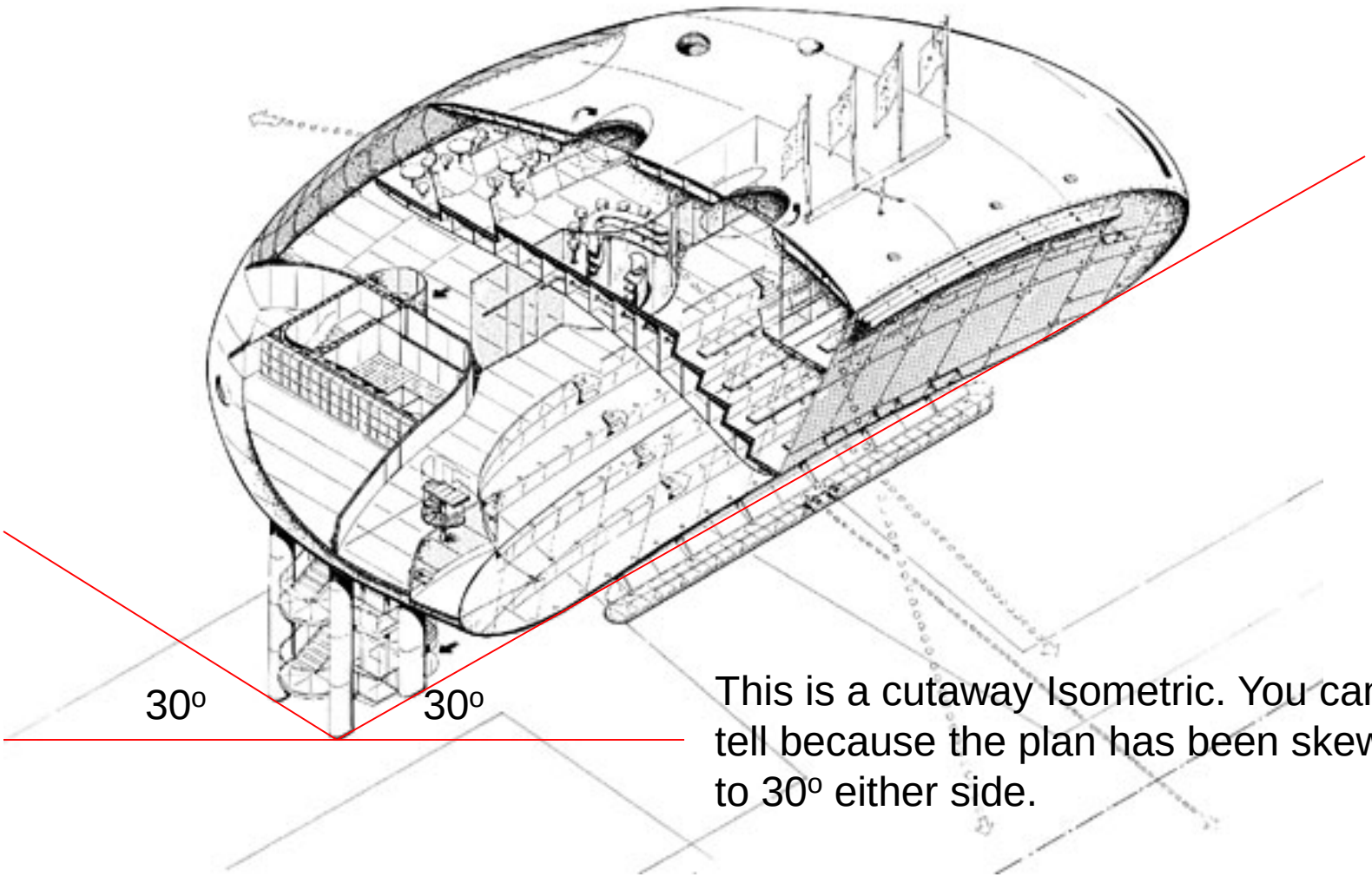
Figure 5.50 Wall section/masonry veneer.

When doing your AXO drawings you are to show the structure as well as a portion of the cladding system.

Make sure that you only clad 20% of the building so that the balance of the structure is visible.



Design axonometric with partial cutaway to show interior.



This is a cutaway Isometric. You can tell because the plan has been skewed to 30° either side.

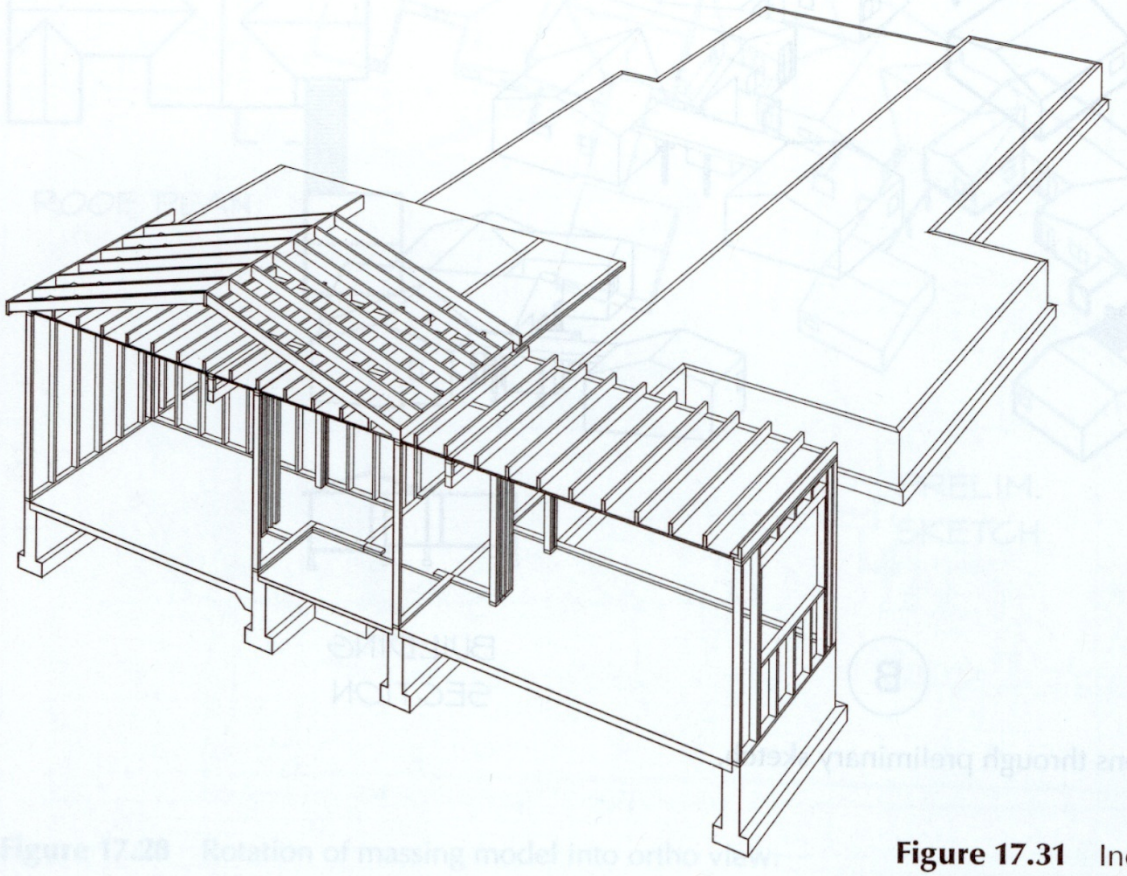
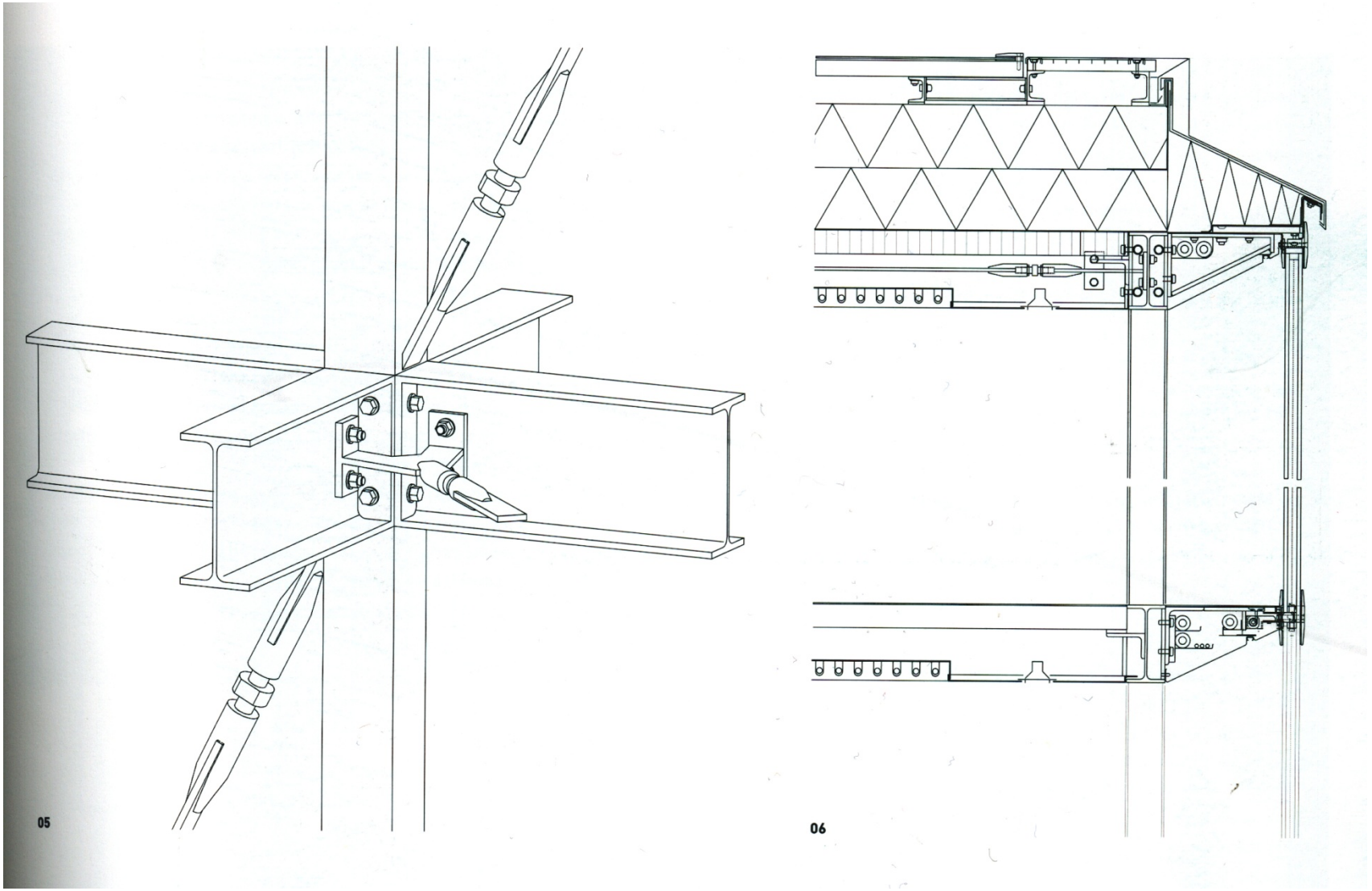
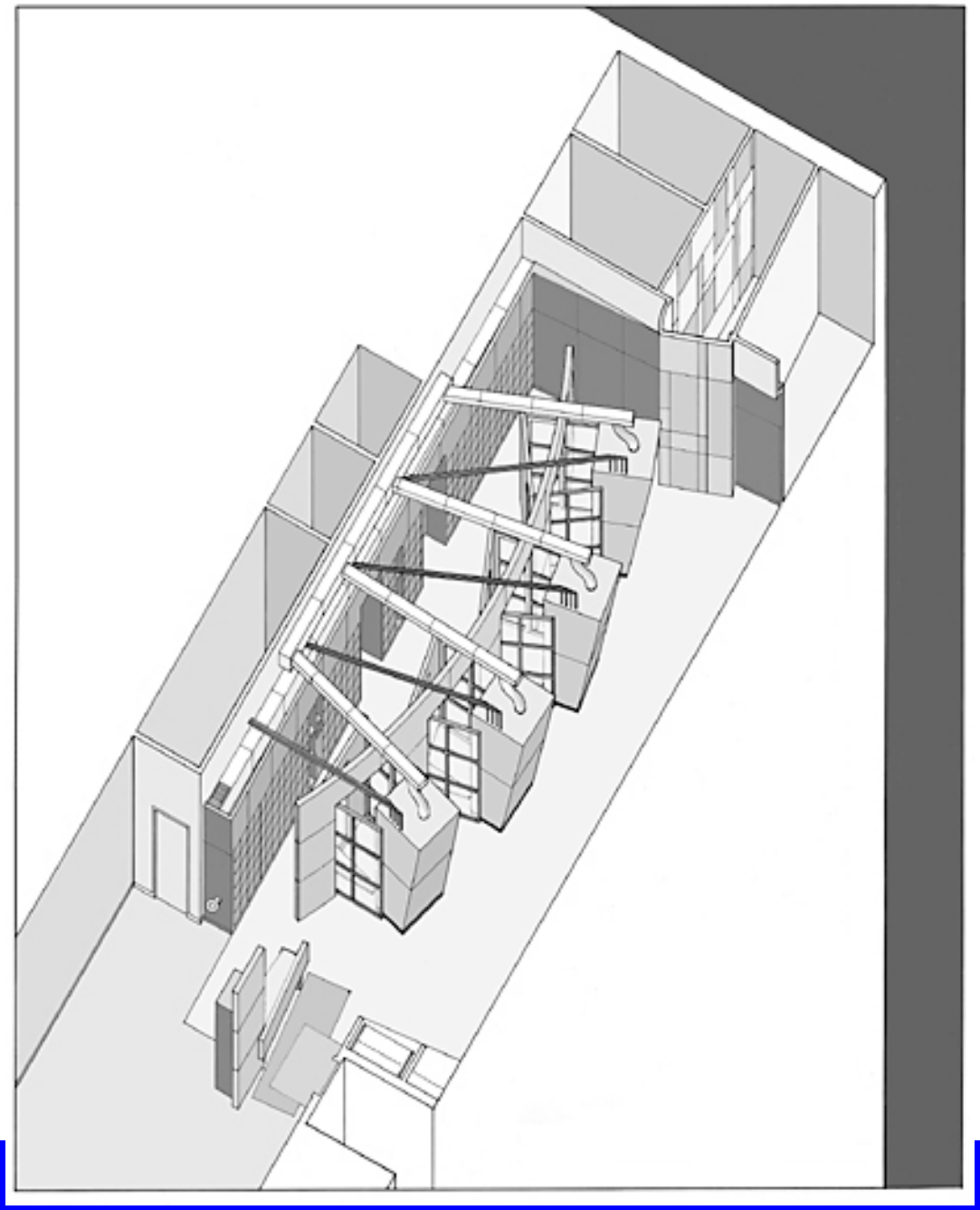


Figure 17.31 Incorporating the individual elements.

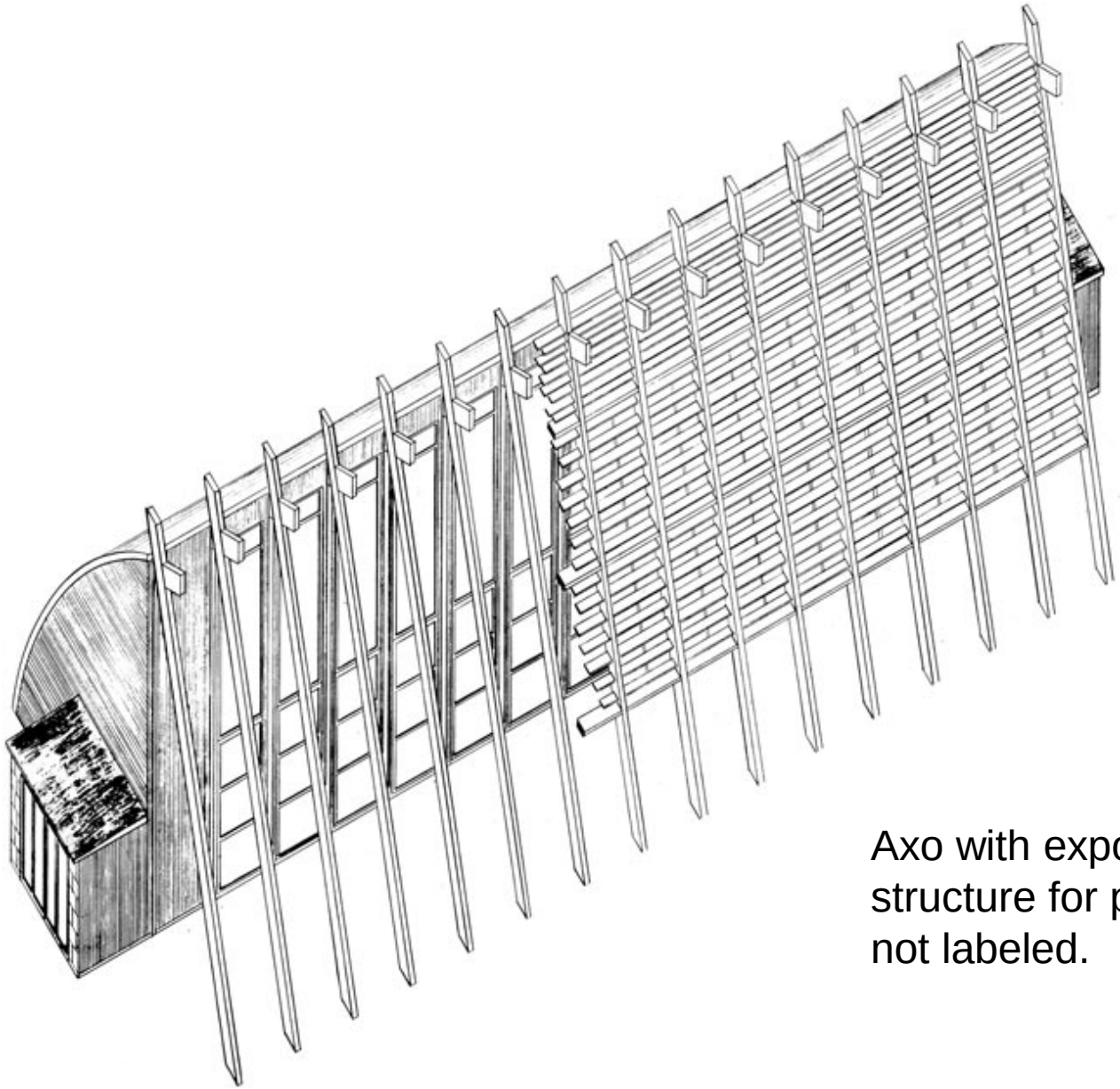
Cutaway section – 3D drawing



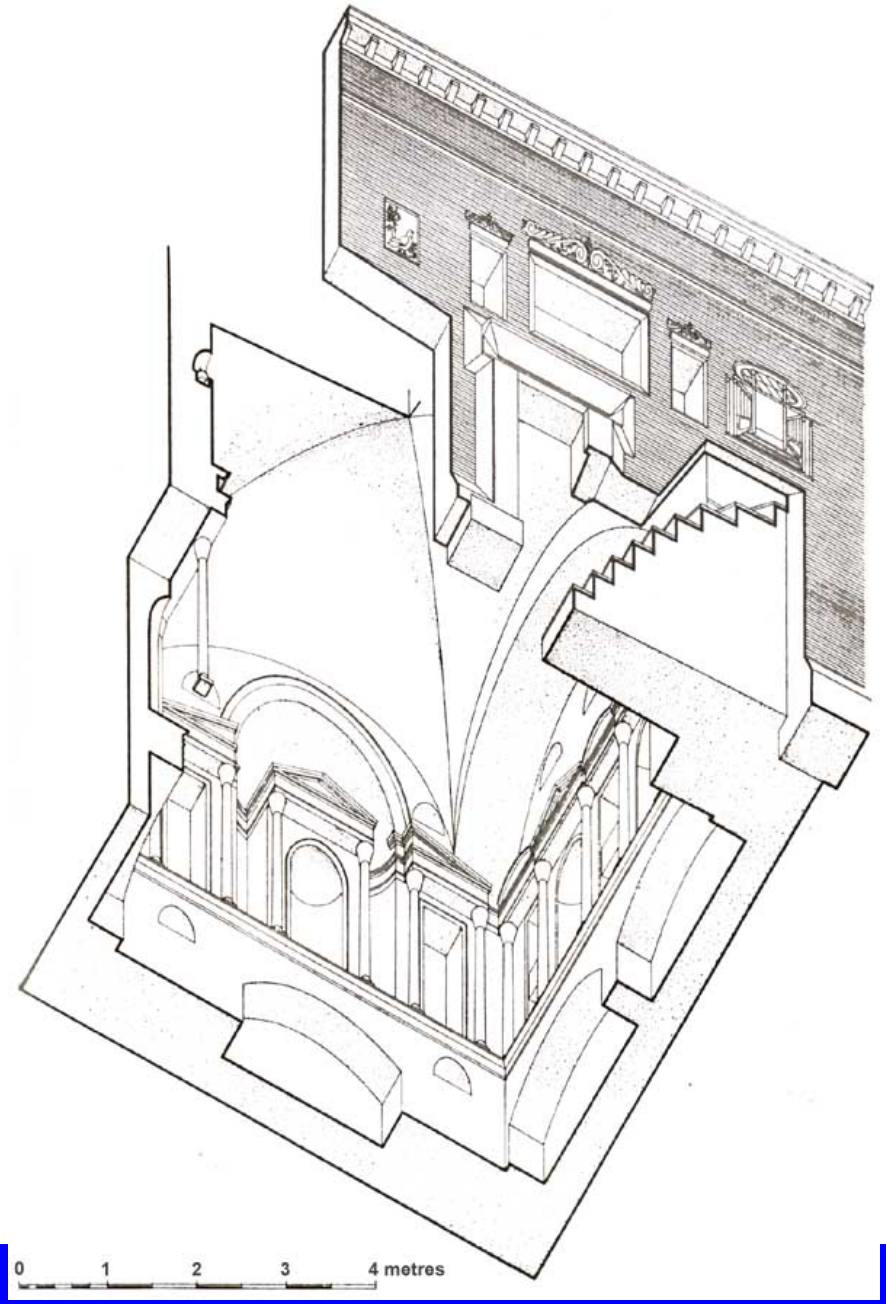
axo/iso detail and section drawing



This axo takes the roof off so you can see the interior layout.

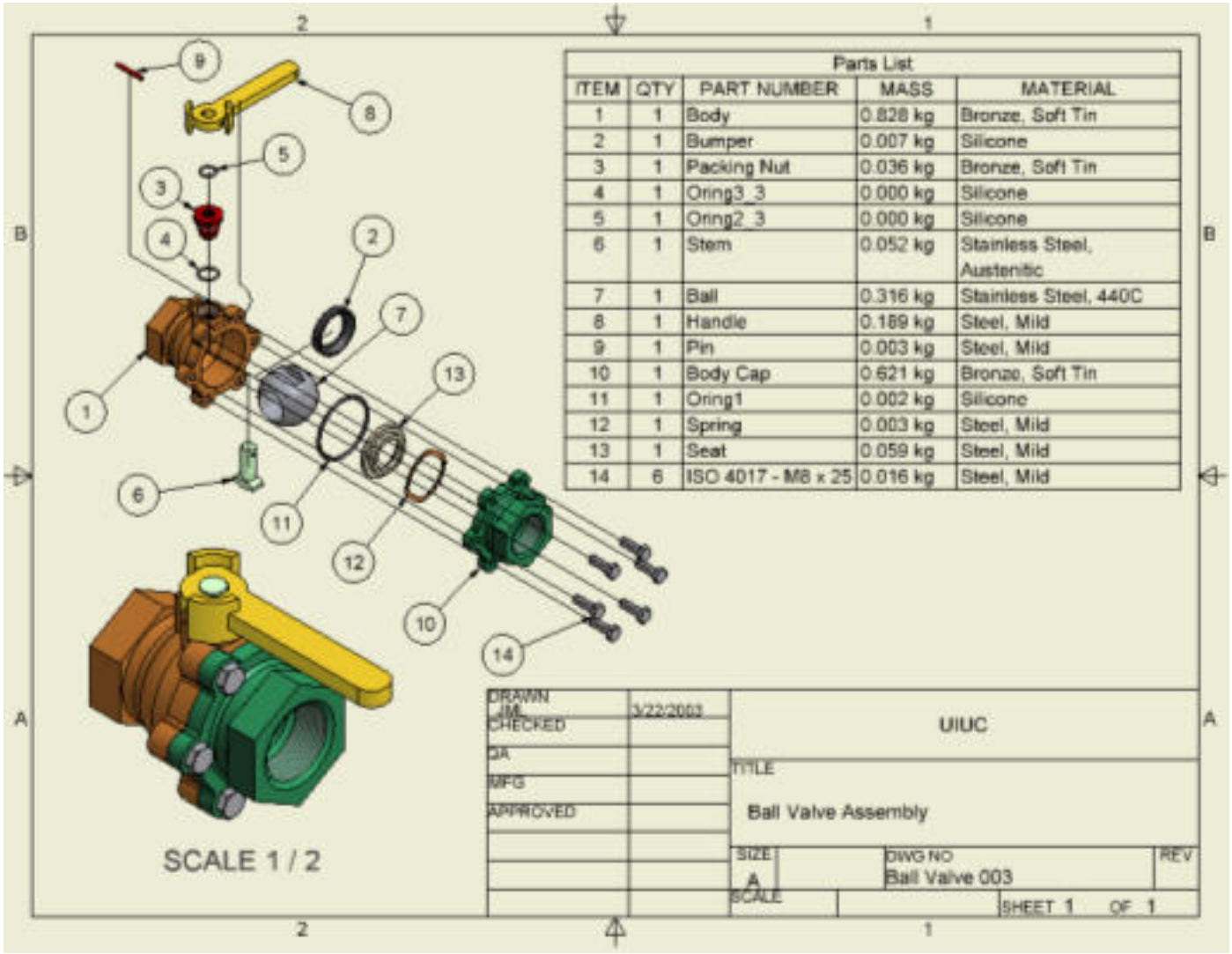


Axo with exposed structure for part, but not labeled.

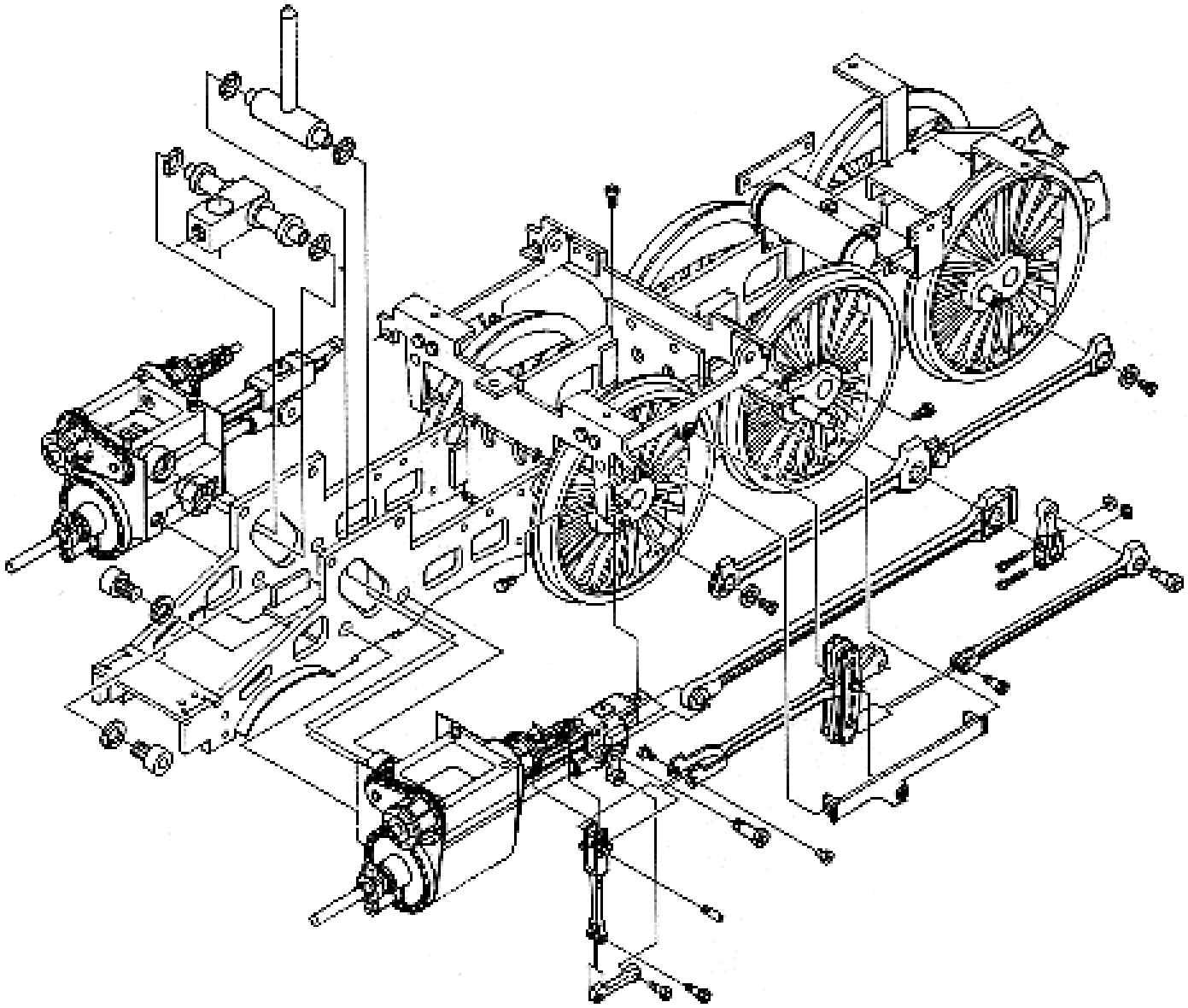


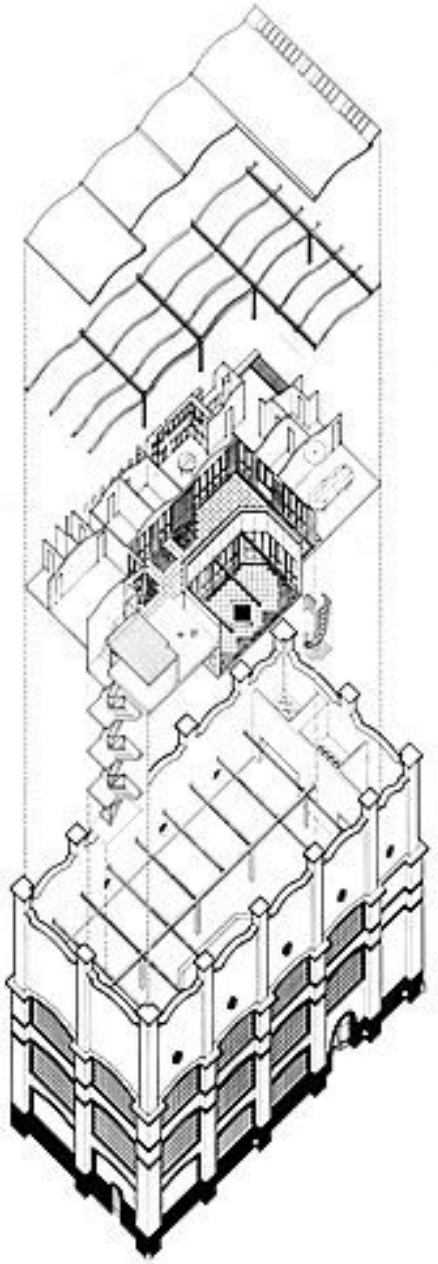
The elusive worm’s eye axonometric drawing that looks at the ceiling.

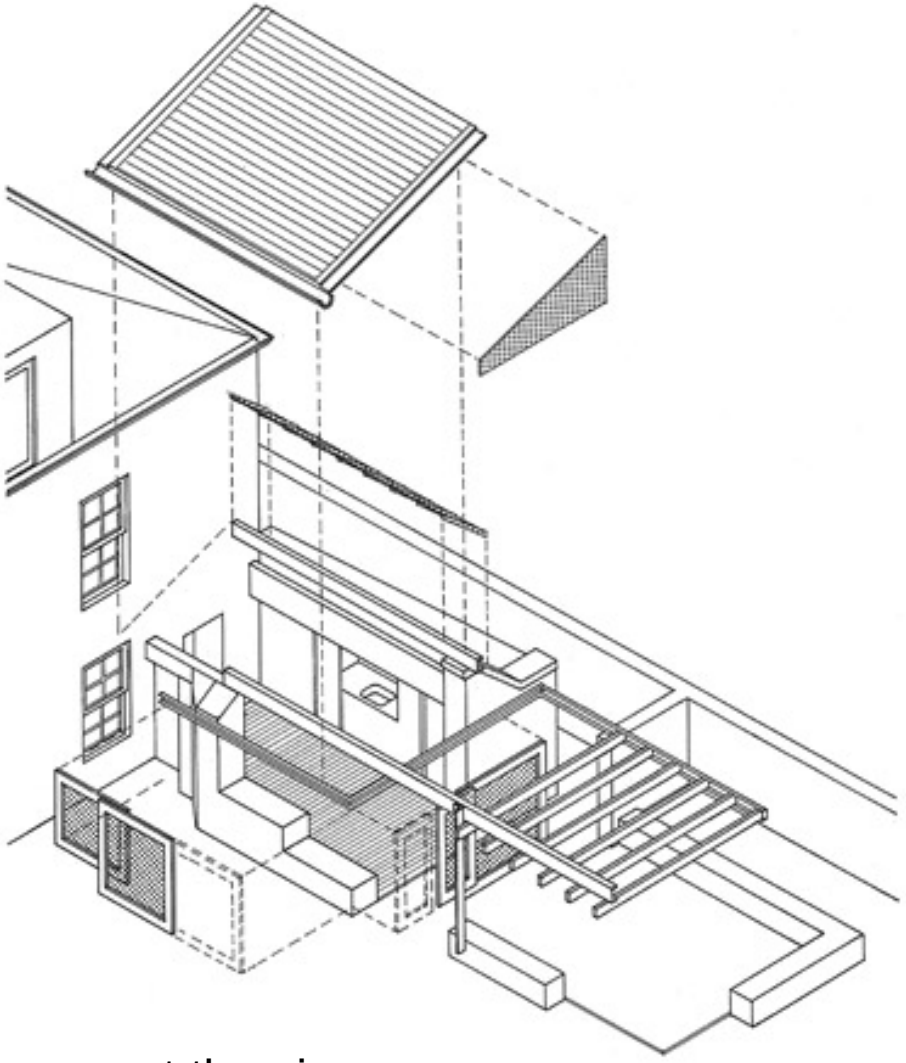
And now for even more fun!



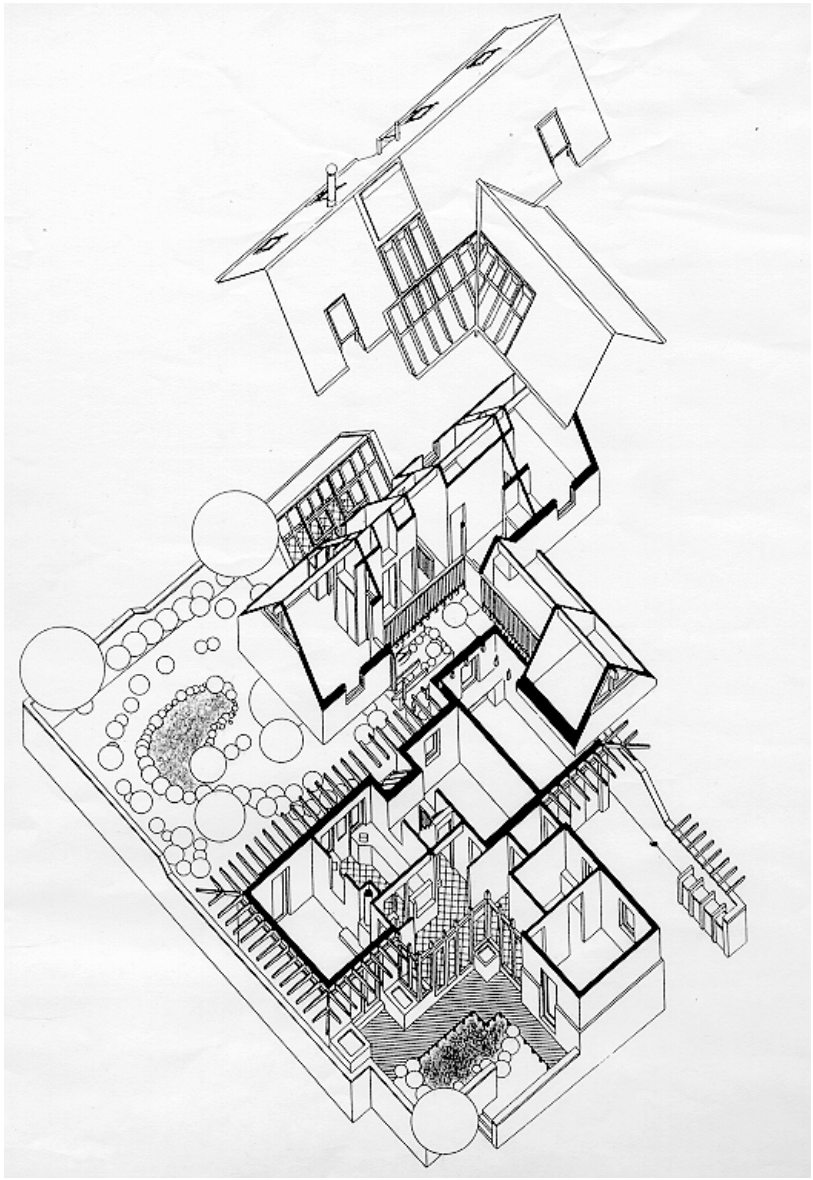
…akin to an industrial assembly drawing….

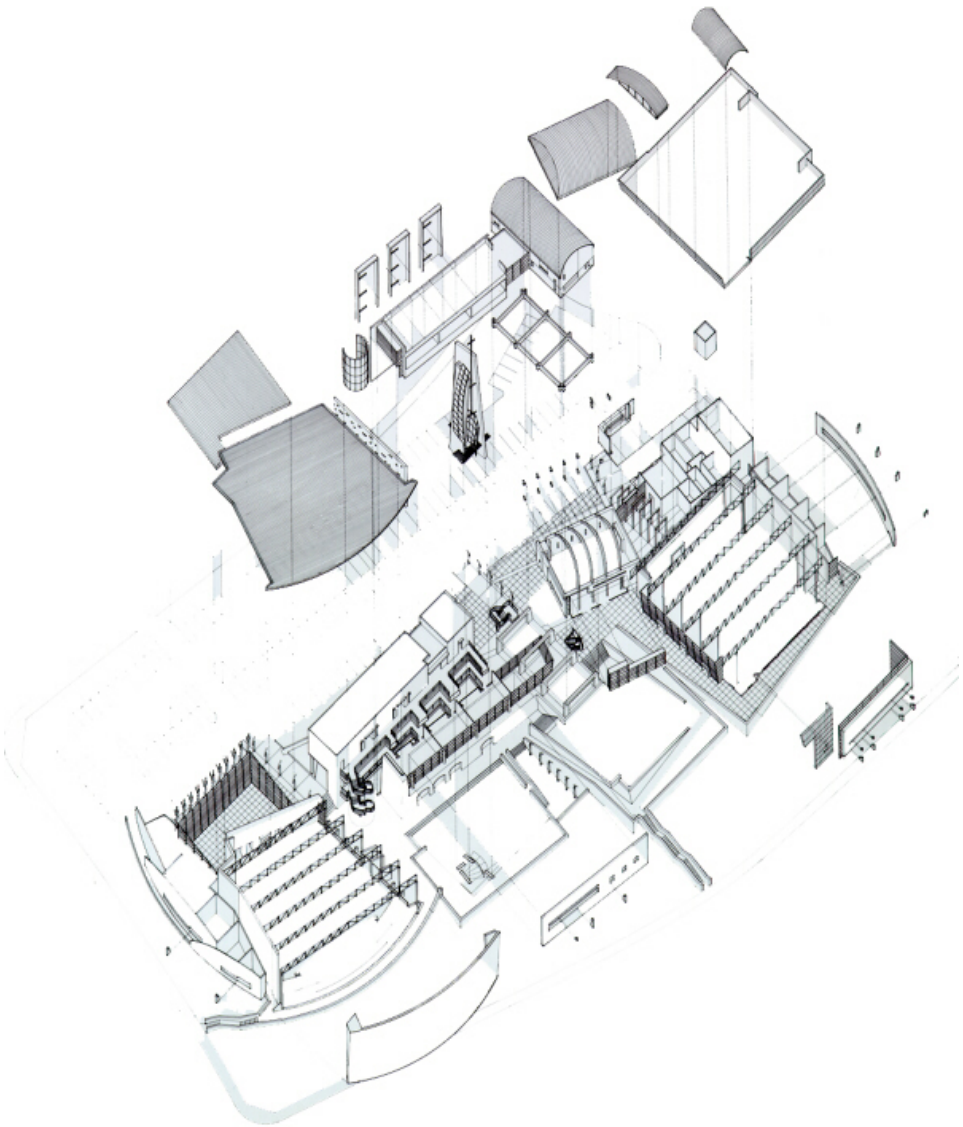




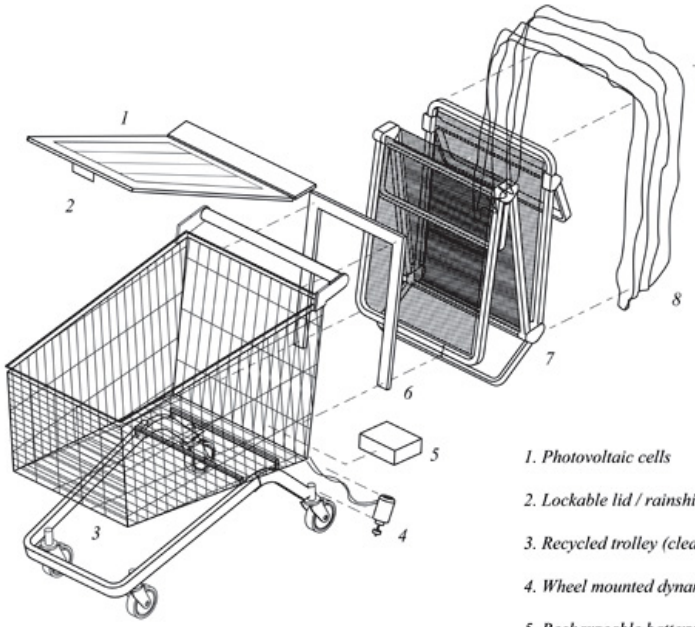


Dotted lines connect the pieces

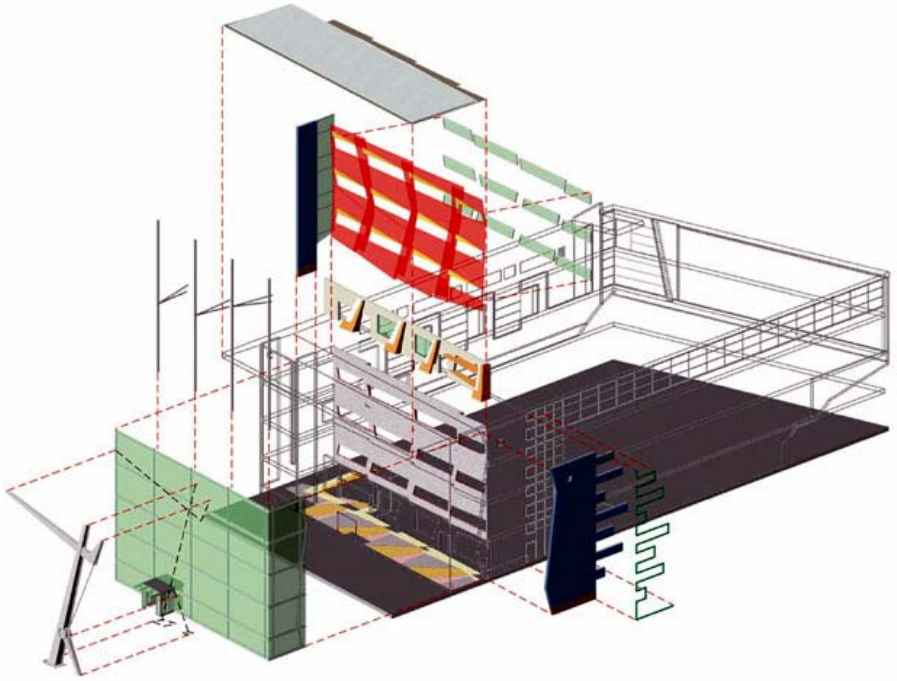




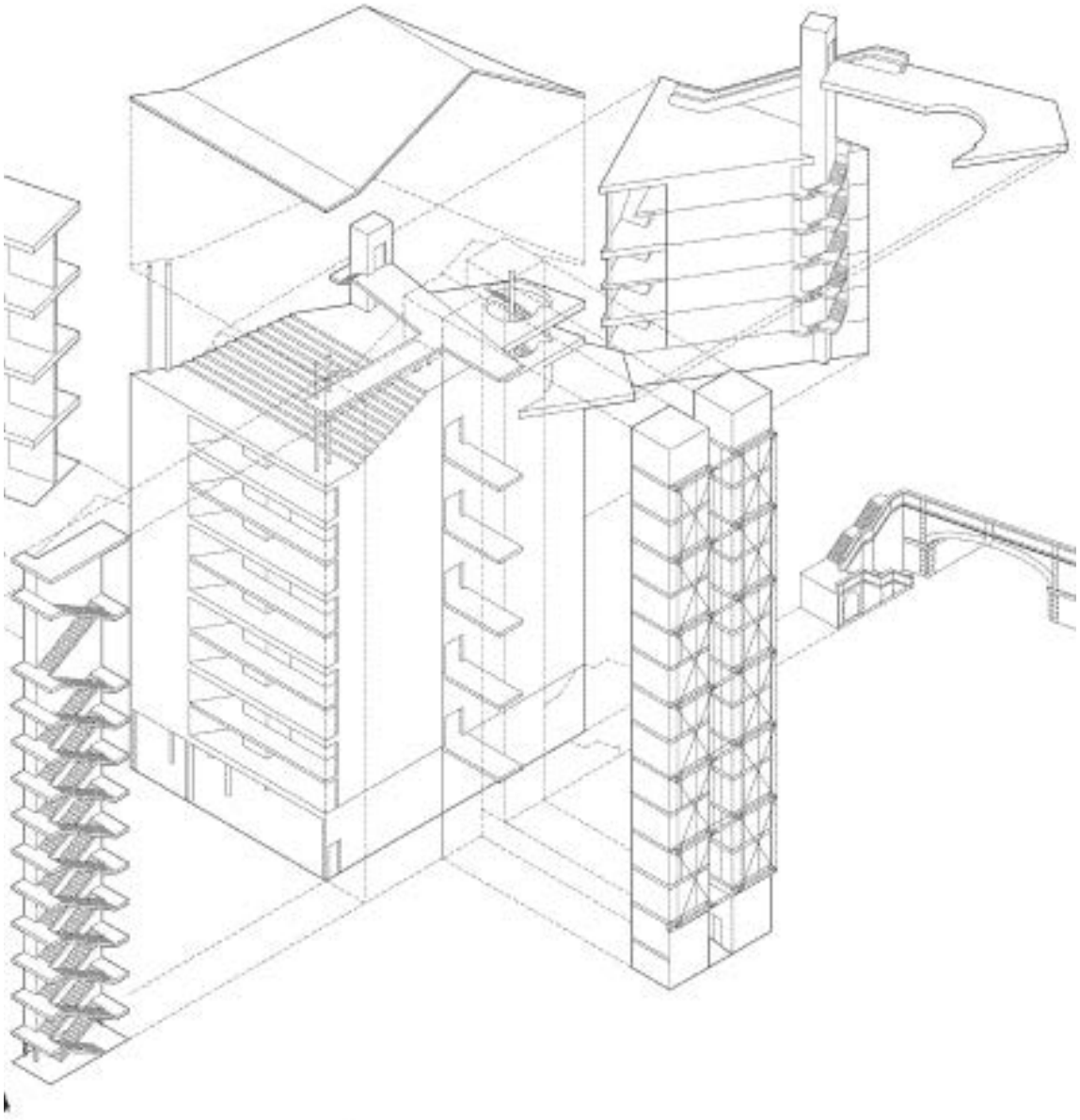
Recycling old discarded shopping carts and foldable recliners



1. *Photovoltaic cells*
2. *Lockable lid / rainshield*
3. *Recycled trolley (cleaned and fixed)*
4. *Wheel mounted dynamo*
5. *Rechargeable battery*
6. *Aluminium mounting frame (recycled window frame)*
7. *Recycled folding recliner*
8. *Recycled polythene sheeting*



Cocoon Carts



Danger!!!

The previous images were used as examples of DRAWING METHOD ONLY.

Do NOT copy the details. They have been drawn from “everywhere” and are likely WRONG for our climate and situation.