



UNIVERSITY OF MINNESOTA



Design+Housing+Apparel

Interior Design Student Handbook

Part 2

Basic Drafting Standards and Symbols

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INTRODUCTION

Drawing is considered to be a universal language. Drafting is a technical drawing used by designers to graphically present ideas and represent objects necessary for a designed environment. A set of these drafted illustrations is called a construction document (CD). There are common rules and standards to ensure that all designers are able to understand what is in the drawing. These design drawings use a graphic language to communicate each and every piece of information necessary to convey an idea and ultimately create a design. The following section of this handbook will help guide you through the common drafting standards that will be used in the Interior Design program at the University of Minnesota.

ARCHITECTURAL DRAFTING

Architectural drafting is basically pictorial images of buildings, interiors, details, or other items that need to be built. These are different from other types of drawings as they are drawn to scale, include accurate measurements and detailed information, and other information necessary to build a structure. These documents are graphic representations to communicate how to do the construction, remodeling, or installation of a design project. These include drawings for floor plans, elevations, sections, details, ceiling plans, finish schedules, and mechanical information such as electrical, plumbing, air conditioning, and heating plans.

TYPES OF DRAFTING

There are three categories of drawings in interior design: process drawings (preliminary images, sketches, schematics, etc.), construction documents (drafted drawings, working drawings, plans, elevations, sections, details, etc.), and presentation drawings (illustrated sketches and three-dimensional views including perspectives, obliques, isometrics, etc.). The main focus of this section is the drafted drawing of which there are also three different types: technical sketch, mechanical drafting, and CAD (computer-aided drafting). These all fall under the heading of architectural drafting as they each convey building detail in scale and use of a common graphic language.

Technical Sketch

Like an artist may use sketches to develop ideas for a painting or sculpture, technical sketches are used during the development of ideas for initial or preliminary plans. The ability to make quick and accurate sketches is a valuable advantage that helps you convey design ideas to others. A sketch may be of an object, an idea of something you are thinking about, or a combination of both. Most of

us think of a sketch as a freehand drawing, which is not always the case. You may sketch on graph paper to take advantage of the lined squares, or you may sketch on plain paper with or without the help of drawing instruments. Technical sketches are drawn without mechanical aid, like a t-square, compass, or straight edge, but, like other forms of architectural drafting, are drawn to scale and contain a variety of line weights and line styles (Figure 1). The pencil or pen is guided by the hand of the drafter alone and this is usually done on trace paper over a 1/4" grid paper. The grid paper becomes the guide helping to keep lines straight.

A technical sketch gives an idea that the design is still being developed while a mechanically drafted or CAD drawing implies an advanced state of planning and gives the impression the design has been finalized.

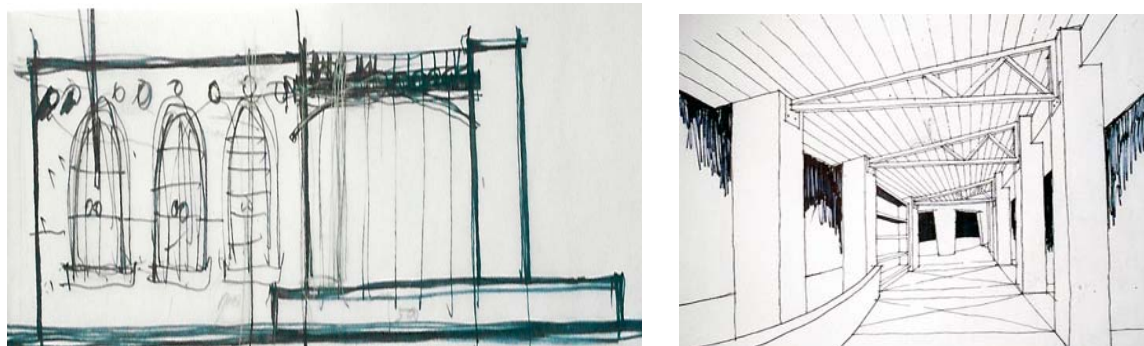


Figure 1. Examples of technical sketch showing ideas and scale of design

Mechanical Drafting

Mechanical drafting is a refined style of drawing in which the pencil or pen is guided by devices such as t-squares, parallel rules, straightedges, compasses, triangles, and French curves (Figure 2). These drawings are developed only after the conceptual phase of a project has been completed and the design is finalized. However, it is typical to see revisions of construction documents as well as

client needs change or other issues arise. The typical set of construction documents consists of mechanical drafted illustrations that include interior and exterior elevations, plans, sections, details and other drawings needed to complete or build a project. These are used within the professions of interior design, architecture, engineering, and other building trade industries and show construction needs, architectural features, structural elements, electrical and mechanical systems, detail drawings related to structures, and furnishings.

Computer Drafting

When drafted documents are prepared on a computer, they are referred to as computer-aided drafting (CAD). An advantage of CAD is the speed of revisions to a document. Instead of redrafting an entire page alterations can be made quickly and easily and the page reprinted or plotted. CAD drawings can also be easily stored electronically and shipped to other designers who can make revisions or alterations. Some design and drafting work can be completed more quickly on CAD, however, you will still need to use technical or mechanical drafting for design development.

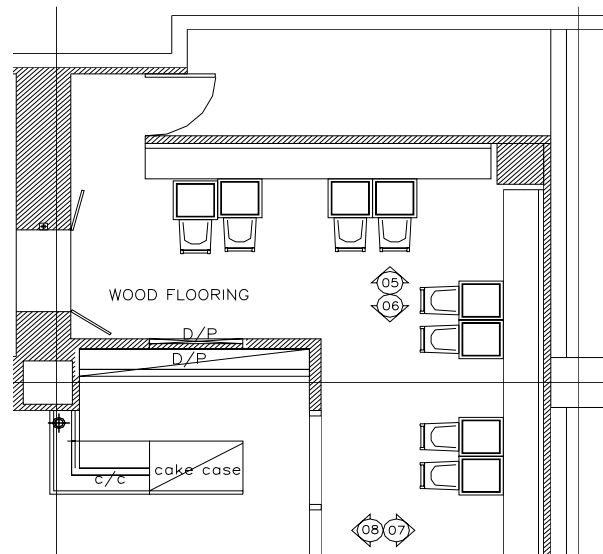


Figure 2. Example of CAD drafting

DRAFTING MEDIA

The papers and films used to draw on are drafting media. While sketching may be done on any size piece of paper or on a variety of types of paper, all forms of architectural drafting, from technical sketching to mechanical drafting, are done on standard sizes and types of paper. There are two main types of paper, tracing and vellum, and there are drafting films such as Mylar and acetate. Tracing paper and drafting vellum are the two most widely used types of drafting media.

TRACING PAPER (also called TRACE) is a medium-grade white (or slightly yellow tinted) transparent paper that takes pencil, ink and marker well. Trace is typically used for sketching and developing ideas, developing initial and preliminary layouts and developing space planning. It is an inexpensive paper and, since it is transparent, a new sheet can be placed over a preliminary drawing to refine it. It is easier and neater to do this than to erase and redraw lines on the original. Some designers use trace for

presentations in the early phase of a design project, then, when the designs are approved and fully developed, they are transferred to vellum.

DRAFTING VELLUM (also called TRACING VELLUM) is a high-grade white (or slightly tinted) transparent paper that takes pencil well, and from which pencil lines can be easily erased. Reproductions can be made directly from pencil drawings on drafting vellum. Vellum also takes pen and ink well. On most papers, ink will bleed (that is spread and absorb into the paper). Ink lines on vellum are crisp and solid as it does not absorb the ink readily; however, caution must be taken to not unintentionally smear the ink before it dries.

GRID or GRAPH PAPER is available in a variety of grid patterns. Most grid media used in interior design has 4 squares per inch. This can represent 1/4" scale for drawing purposes. It is used for planning, drawing, rough design sketching, technical sketches, or simply under a sheet of trace as a guide.

DRAFTING SHEET SIZES

Most drafting media are available in three styles: rolls, plain sheets, and preprinted sheets with borders and title blocks. There are also sheets available with non-photo blue (a light blue color that does not reproduce when making blueprints) grids. Entry level design projects at the University of Minnesota require the student designer to create borders and title blocks, so plain sheets or rolls will be used primarily throughout the first year.

According to ANSI (American National Standards Institute) in the United States an 8.5 x 11 inch piece of paper is an *architectural* "A" size sheet. This is typically referred to as letter size. The "B" size sheets are 11 x 17 and are typically referred to as a "tabloid" size sheet of paper. The "C" size sheets are 18 x 24 inches and the "D" size sheets are 24 x 36 inches. Most drafting for interior design purposes is done on the B, C, and D size sheets. The decision for choosing a size should be based on project

requirements, the scale of the drawings, and the scope and size of the final structure. Trace and vellum may be purchased on rolls that require sizing the paper properly. Trace may be sized by measuring the length needed and using a straight edge, T-square, or parallel rule to rip the paper off of the roll. Trace rips easily and slightly rough edges are expected. Vellum from a roll should be measured to its proper length and then using a straight edge and an X-acto knife on a proper cutting surface trim the paper to its proper length. Scissors should never be used in cutting trace or vellum.

LINE WEIGHTS

Line weight and line quality are extremely important to a successful set of design drawings. Usually a set of design drawings will go to many different people including the client, other designers or architects, manufacturers, builders, and others within the profession. The lines used for design drawings must be crisp and dark so that they are easy to reproduce and clear copies can be made from them.

The line weight is the light or darkness and width of a line. Manual pencil drafting, drafting in ink, and computer-aided drafting documents must have a variety of line weights. Varied drawing line weights, typically three, should be used on every drawing. These include light, medium, and bold lines. Aside from these lines used to illustrate a drawing, there are also guidelines and border lines. Guidelines are used for page layout and borderlines are used for framing the page. These different weights technically help to create an easy to understand document and artistically add visual interest to the document. These documents must also have consistent line quality, which is the uniformity of lines throughout a drawing. These two elements give a sense of professionalism to the documents, provide visual interest, create a clear and easy to read document, and demonstrate the drafting skills and abilities of the designer.

Pencil lines should be solid, uniform in width, and consistent in darkness throughout their length. If a line in a drawing needs to be changed, make sure to erase it cleanly and recreate the line in the appropriate line weight and quality. If only a part of the line needs to be modified, erase using the erasing shield and make sure the new segment and the existing segment match perfectly in width and darkness. Being consistent also applies to pen and ink drawings and CAD drawings. A pen and ink drawing is usually created first with very light guidelines. When using ink technical or drafting pens, typically the light, medium, and dark weights are created in proportion to one another. For example, if light is a width of .05, then medium is .1 and dark is .2. The actual width of each line type should also be related to the size and scale of the drawing. A drawing in 1/4" scale, like a floor plan, may need smaller pen widths than

a drawing in 1-1/2" scale, like a kitchen cabinet drawer detail. The best way to create consistent line weights and line quality is to keep your pencil or pen perpendicular to the drawing surface and drawing media. This keeps the width of the line consistent. Also, keep a constant pressure as you draw a line type from its start to finish. This takes practice and can be mastered if you focus on creating the line consistently and do not try to rush a drafted document.

Keep in mind the hardness/softness and the diameter of the pencil lead only help control the line weight. You also need to use a consistent amount of pressure on the pencil as you draft to keep each weight of line uniform. If the line seems either too light or too dark try varying the amount of pressure you place on the pencil as you draft. Remember, these drawings are meant to be copied and distributed to a variety of design professionals so the lines need to be crisp and readable.

Lines and Line Quality

- **Guidelines or Construction Lines** (4H to 6H pencil lead in a .3mm mechanical pencil)

The initial lines that you will draw on your paper are guidelines or what some refer to as construction lines. These lines are temporary and used to lay out the page, create the initial shapes, and provide a guide for lettering heights. The line weight for guidelines is to be very light as they should be almost invisible on the finished drawing. They must be dark enough for you to see, light enough to erase lines easily, and barely visible when copies or other form of reproductions are made from the drawing. Using a harder 4H to 6H pencil lead in a .3mm mechanical pencil creates the best guidelines. You can also use a blue lead for guidelines as it will not photocopy.

- **Bold Lines** (soft B to 2B pencil lead in a .5mm or .7mm mechanical pencil)

The primary objects in a drawing should be created using a bold line. Bold lines are very dark and have a thick width. These are created with a .5mm or .7mm mechanical pencil and a soft B to 2B pencil lead. Walls in plan view and the outline around the perimeter of an elevation or three-dimensional object are examples where bold lines should be used.

- **Medium Lines** (HB pencil lead in a .5mm mechanical pencil)

Secondary objects such as doors, furnishings, counters, and cabinets should be drawn in a medium line weight. In elevation and 3D views, the perimeter of an object may be drawn in a bold line weight however the information inside the object should be drawn in a medium weight. Medium line weights are best created using a .5 mm width pencil with HB pencil lead.

- **Light Lines** (H to 2H pencil lead in a .3mm or .5mm)

Action lines, information lines, and fill patterns should be drawn with light lines. Action lines show potential movement of an object and include door swings in plan view and hinge direction in elevation view. Information lines convey information about a drawing and include dimension lines, center lines, leader lines, sections lines, and so on. Fill patterns are specific symbols used to indicate a type of material being used. The light lines can be created with a .5 mm pencil or with a .3 mm pencil and H to 2H pencil leads. It is very important that all of these lines are visible, so do not confuse the term “light” with “hard to see.”

- **Border Lines** (2B to 4B pencil lead in a .7mm or .9mm pencil)

Border lines are used to create a margin on the drawing sheet and to create the lines around the title block. Border lines should be as dark and about twice as thick as bold lines. A .7 mm or .9 mm pencil with a 2B to 4B lead works well for creating borderlines.

Keep in mind that the softer the lead, B, 2B, etc., the easier it is to smudge the line once it is drawn. For this reason border lines should be the last line drawn on your drafted document.

LINE WEIGHTS FOR LETTERING

The weight of the lines for lettering varies with the size and scale of the drawing and the visual importance of the lettering. Random notes on the drawing and information from leader lines and dimension lines may be a lightweight line to match the line style. Text within a title block may be medium to bold depending upon its importance. Likewise, lettering used to label a drawing such as FLOOR PLAN or SOUTH ELEVATION, may need to be medium or bold as well. Within the range of light, medium, and bold line weights, you may also vary the weights slightly as needed to emphasize a part of the drawing. Typical lettering heights are: 3/16"-1/4" for main titles under drawings; 1/8"-3/16" for subtitles and room names; 1/8" for notes and dimensions; and 1/2" for sheet number in the title block.

DRAFTING STANDARDS AND SYMBOLS

Architectural drawings are intended to communicate design intentions in a clear manner. This can be best presented with graphic symbols and written forms. Industry standards have been developed to provide a universal language of graphic symbols and written forms for different design companies and building professions. Typical drafting standards and symbols are described below.

LINE TYPES

Along with line weight and quality, there are standards for different types of lines. Each has a definite meaning and is recognized as a typical symbol or object within the building trades industry. Listed below are the standard types of lines that will typically be used in design drawings.

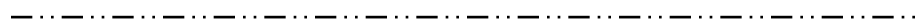
Solid Line

Solid lines are used to indicate visible objects that can be seen in plan, elevation or 3D views. Solid lines are also used for leader lines and dimension lines.

Dashed Line

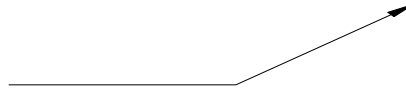
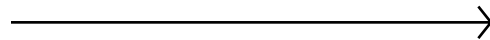
Hidden objects or edges are drawn with short dashed lines. These are used to show hidden parts of an object or objects below or behind another object. Dashed lines are also used to indicate shelving or cabinets above a counter. These lines should be in contact at corners and when perpendicular to another line.

Movement, Ghost or Phantom Line



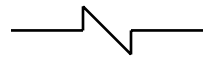
These lines are a series of dashes and very short dashes and are used to show movement or imply direction. These typically are used instead of a dashed line to show an alternate position of an object that can be moved. One object would be drawn with a solid line and its alternate position would be dashed or a phantom line. This can include bi-swing doors, the space needed for drawer and cabinet door openings, sliding door opening direction, hinge points for doors and windows in elevation views, etc.

Leader Line



Leader lines are used to connect notes or references to objects or lines in a drawing. Leader lines start as a solid line and end in an arrow. Leader lines may be drawn at an angle or curved.

Break Lines



Break lines are used when the extents of a drawing cannot fit on the size of paper being used for the drawing. It can also be used when you only need to illustrate a portion of a design or a partial view.

Center Line



Center lines are used to indicate the center of a plan, object, circle, arc, or any symmetrical object. Use a series of very long and short dashes to create a center line. If two center lines intersect use short dashes at the intersection.

Section Line

The section line is used to show a cutaway view of a floor plan. A section cutting all the way through a floor plan is referred to as a full section. The direction of the arrows shows the direction of the section view. The symbols on the end of the section line indicate the drawing number on top and the page number the section will be located on the bottom (Figure 3).

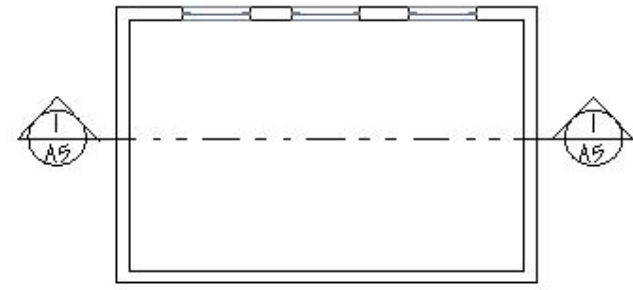


Figure 3. Section symbols and lines placed on a drawing

Dimension Line

The dimension line is used to show the measurement of an object. It can be used to indicate length, width, diameter, etc. The dimensions are listed in feet and inches on floor plans and elevations (Figure 4). Detail drawings of cabinetry or other custom pieces are dimensioned in inches.

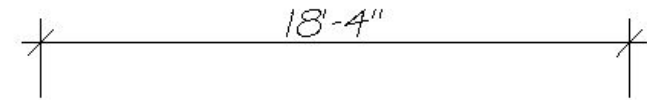


Figure 4. Use of dimension line

MATERIAL SYMBOLS

Material symbols represent the construction materials cut in section. Below is a list of materials and their symbols used on architectural drawings (Figures 5 & 6).

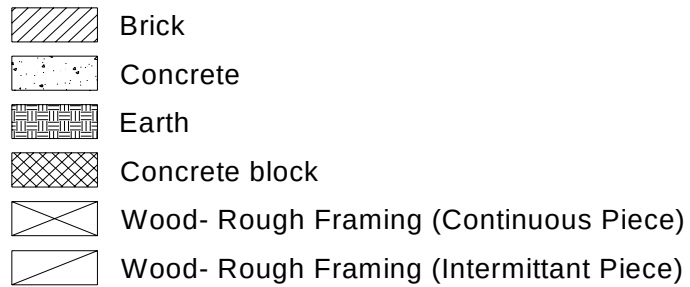


Figure 5. Examples of material symbols in section

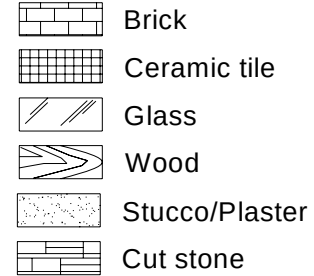


Figure 6. Examples of material symbols in elevation

ARCHITECTURAL GRAPHIC SYMBOLS

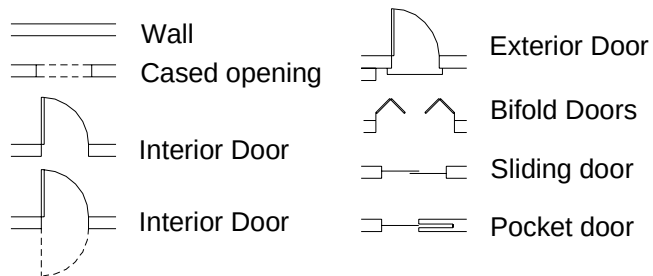


Figure 7, Walls & doors symbols in plan view

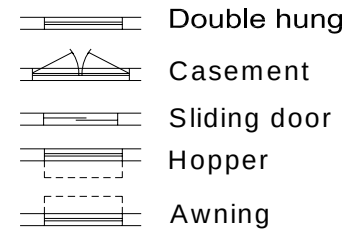


Figure 8. Window symbols in plan view

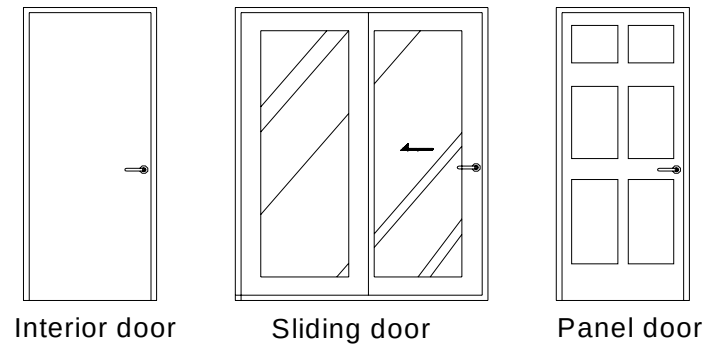


Figure 9. Examples of door symbols in plan view

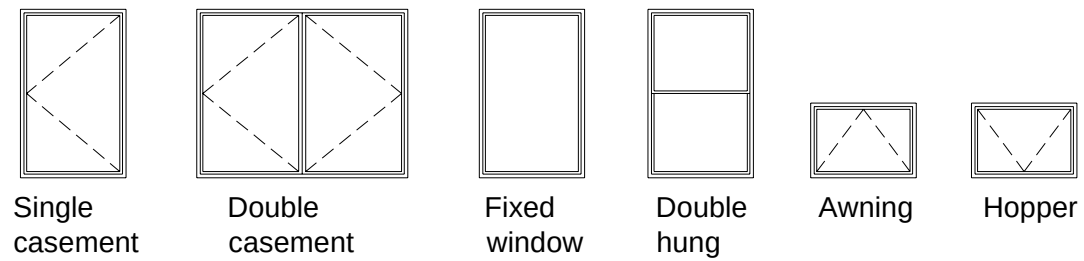


Figure 10. Examples of window symbols in elevation view

DRAWING SYMBOLS FOR CROSS- REFERENCE

Section Symbol

Section symbols are used to indicate where sections are cut. The section mark consists of a 1/2" diameter circle, an arrow that indicates the view direction of sight which is filled solid black, and two numbers (Figure 11). The upper number tells the section number on the sheet and the lower number indicates the sheet number where the section is drawn. Generally a section call-out is composed of two same section marks, one on each end of the cutting plane line, (Figure 12).

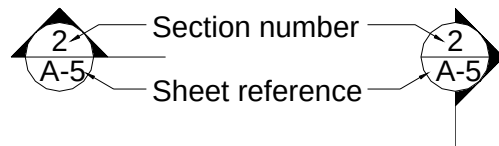


Figure11 Section symbol



Figure 12. Simplified section symbol on one end

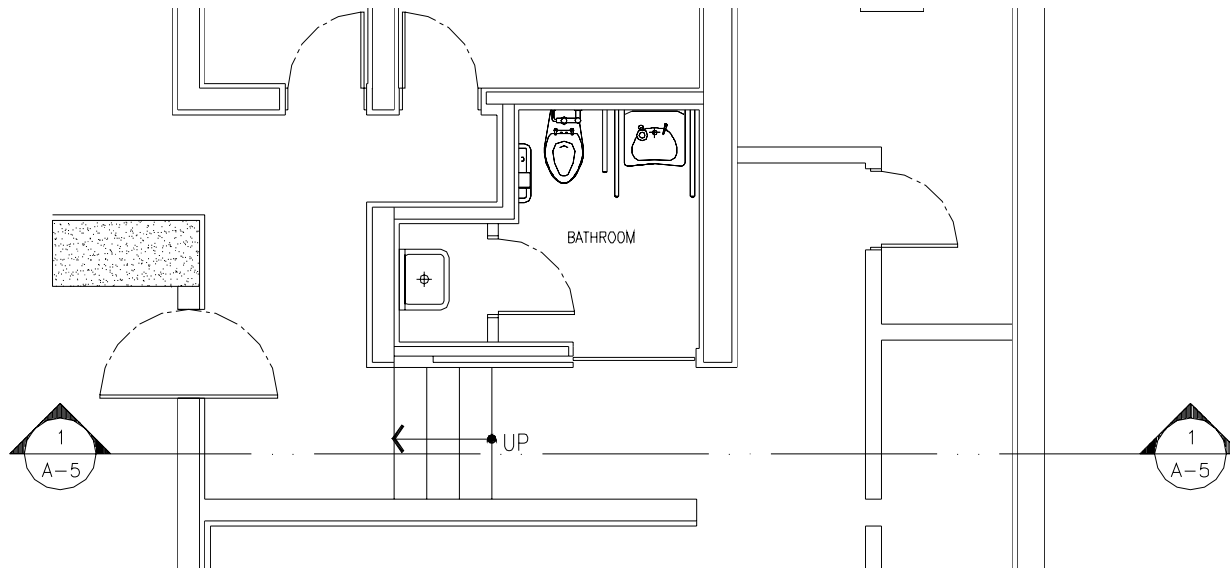


Figure 13. Section symbols used on the plan view

Elevation Symbol

Elevation marks are used to indicate which direction and from which point on the floor plan is drawn. The elevation mark consists of a 1/2" diameter circle, an arrow that indicates the direction of sight, and two numbers. The upper number tells the elevation number on the sheet and the lower number indicates the sheet where the elevation is drawn. Elevation marks can be placed at each spot for different elevation views, as shown Figure 14. Or multiple elevation symbols may be used for the elevation views that are drawn from one middle spot of the space (Figure 15).

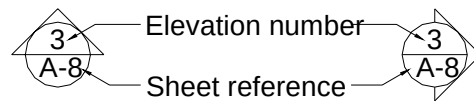


Figure 14. Elevation symbol

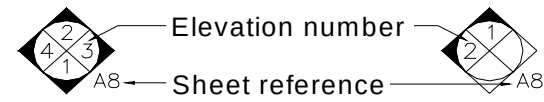


Figure 15. Multiple elevation symbol

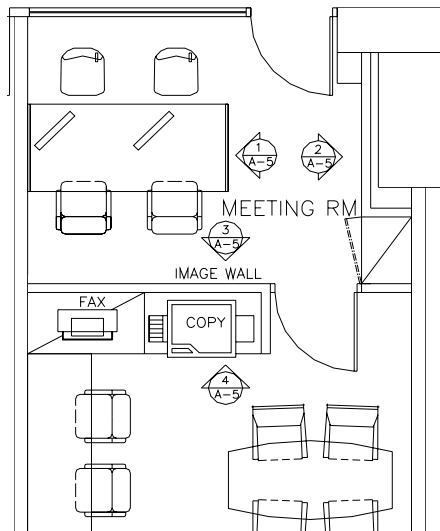


Figure 16. Elevation symbol used on the plan view

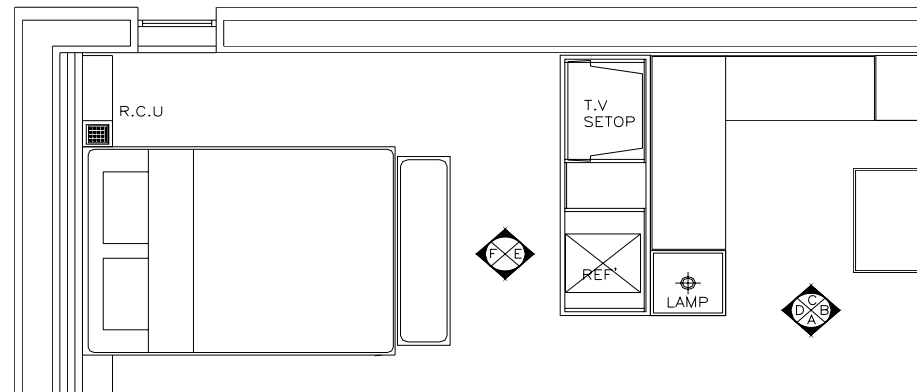


Figure 17. Multiple elevation symbol used on the plan view

Detail Symbol

Detail drawings are identified by a detail mark composed of a 1/2" diameter circle and two numbers. The upper number tells the detail number on the sheet and the lower number indicates the sheet number where the detail is drawn (Figure 18). The feature that needs a detail drawing is enclosed in a large circle and connected to the circle of the detail mark with a leader (Figure 19). Detail symbols are used on not only floor plan but also elevation or section drawings (Figure 20).

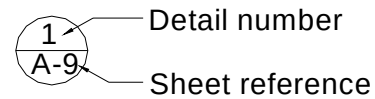


Figure 18. Detail symbol

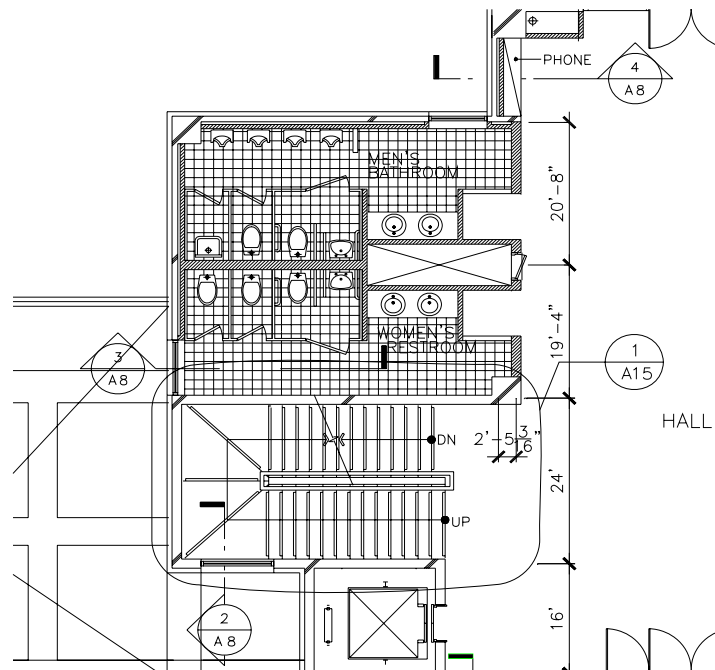


Figure 19. Detail symbol used on the plan view

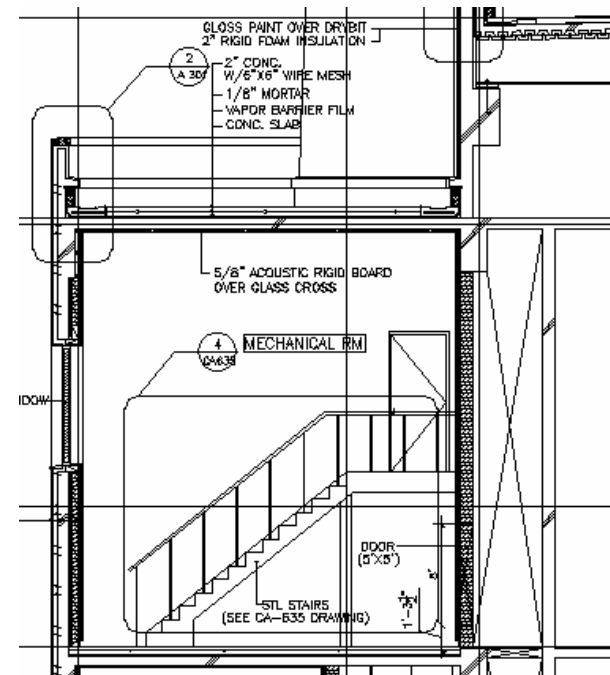


Figure 20. Detail symbol used on the section view

Elevation Datum

Elevation data are used to indicate a level line control point. An elevation datum has three parts. Farthest from the drawing is a $\frac{1}{4}$ " diameter circle with two lines crossing inside horizontally and vertically, and the upper right part and lower left part are filled with solid black. Above the horizontal line stretched out from the middle of the circle is a description of a point where a level is measured such as ceiling line, grade, or finished floor plan. The actual elevation that is the height of the point is described below the horizontal line (Figure 21). An elevation datum is generally used for exterior elevations.

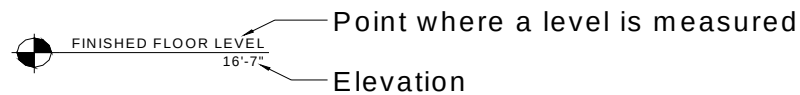


Figure 21. Elevation Datum

Door Number Symbol

Doors are identified by a door number symbol. A door number symbol has a $\frac{3}{8}$ " diameter circle and a number inside (Figure 22). The number indicates either door number or door type, depending on the project. The number is then referenced to the door schedule.



Figure 22. Door number symbol

Window Letter Symbol

Windows are identified by a window number symbol. A window letter symbol has a $\frac{3}{8}$ " diameter hexagon and a letter inside (Figure 23). The letter indicates either door number or door type, depending on the project. The letter is then referenced to the window schedule.

B

Figure 23. Window number symbol

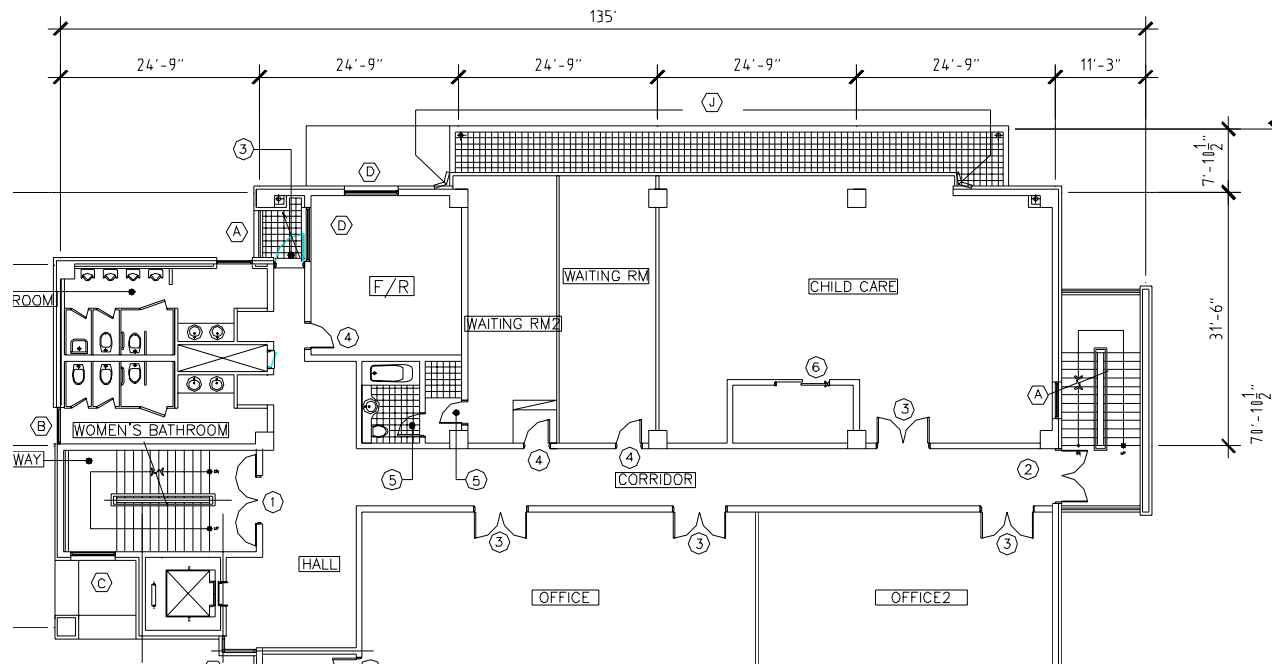
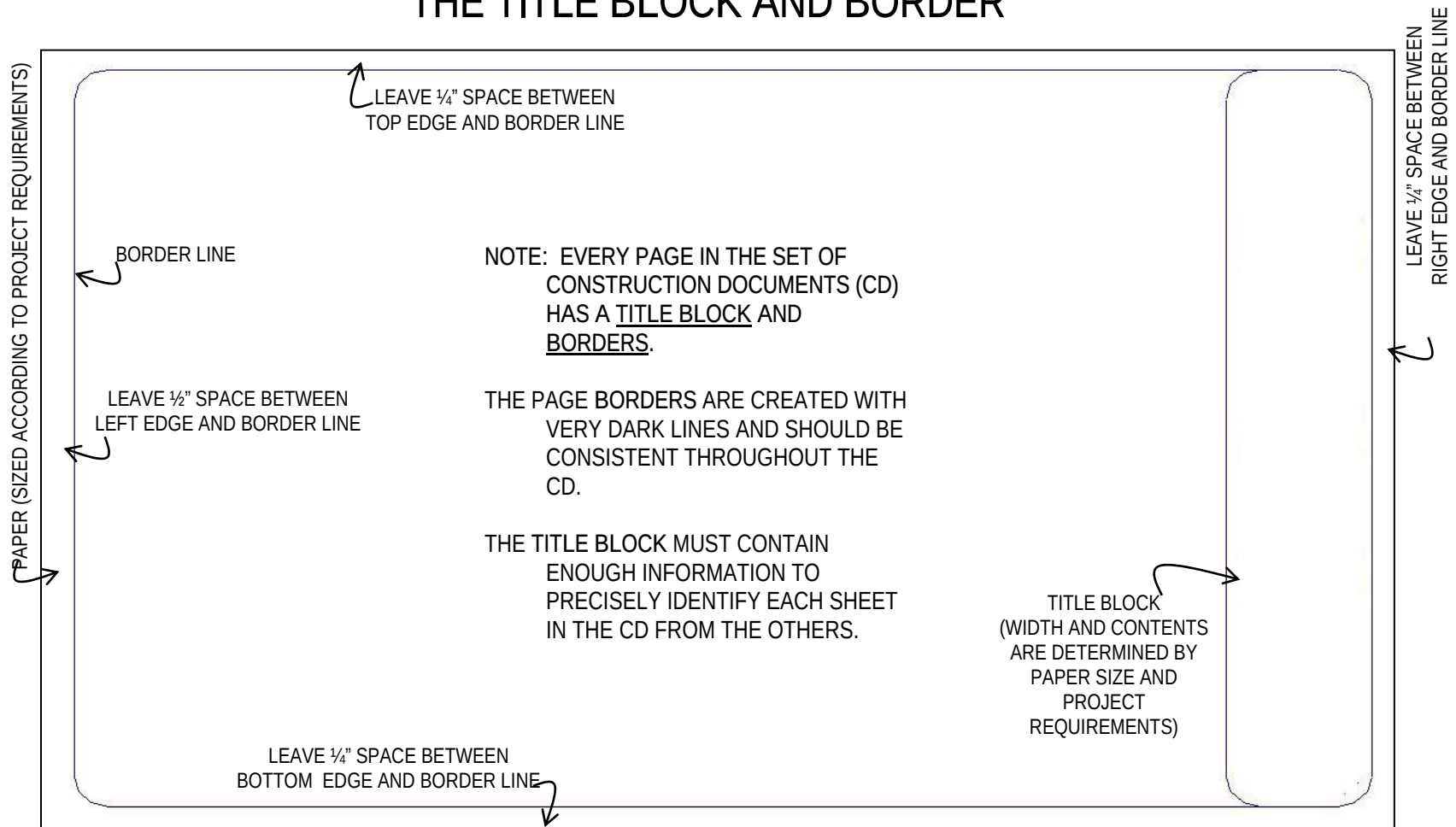


Figure 24. Door and window symbols used on the plan view

TITLE BLOCK - Borders, contents, (use title block handout for info), and sheet numbering.

THE TITLE BLOCK AND BORDER



THE TITLE BLOCK

THE TITLE BLOCK TYPICALLY INCLUDES THE FOLLOWING ITEMS:
(THIS MAY VARY DEPENDING UPON THE PROJECT REQUIREMENTS)

Name of the design firm doing the job. This should be in a larger, bolder text and include a logo if possible and address, telephone, web address, e-mail, etc.

Name of the major design consultants. List civil, structural, mechanical, electrical engineers and other consultants. Include contact information.

Space for professional stamp or seal. Depending upon the type and scope of the project, this may be required.

Revisions. Leave space for at least six entries, a name and date.

Key plan. A small scale plan of the building footprint with the part of the building identified that relates to the drawings on the sheet. This is not always necessary on smaller projects.

Name of the project. List the project title, location information and client/owner name if applicable.

Client approval. Client signature indicates approval of the document, as they are currently presented.

Project or job number, date and credits (designer/firm's name). Some projects are divided into phases with an individual job number for each phase. Typically this is done when a project is developed over a long span of time or if it is complex.

Sheet title. The page title is usually short and specifically states the drawing(s) on that page (e.g. floor plan or details, etc.). Below title, state the scale of the drawing.

Sheet number. There is usually a letter and a number, (e.g. T1 for title page, A1 for architectural drawings, or E1 for electrical). Most of the drawings you will do are architectural and should be numbered consecutively A1, A2...

UNIVERSITY OF MINNESOTA DHA 1601 - ID STUDIO 1	
Design Consultants: Student Name Address Telephone	
Professional Stamp/Seal	
NAME:	Date:
NAME:	Date:
NAME:	Date:
NAME:	Date:
NAME:	Date:
NAME:	Date:
Revisions	
Plan Key	
RESIDENTIAL DESIGN	
Client Approval/Date	
PROJECT 5 NOVEMBER 7, 2004	
FIRST FLOOR PLAN SCALE: 1/4"=1'-0"	
SHEET NUMBER	A1

TYPES OF PLANS

TYPICAL SCALES FOR DRAWINGS

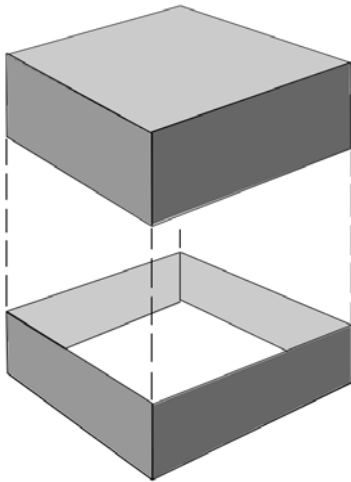
	Residential Drawings	Commercial Drawings
Site Plan	1"=20' or 40'	1"=20' or 40'
Foundation Plan	1/4"= 1'-0"	1/8"=1'-0"
Floor Plan	1/4"= 1'-0"	1/8"=1'-0"
Elevations	1/4"= 1'-0"	1/8"=1'-0"
Building Sections	3/4"= 1'-0"	1/4"=1'-0"
Construction Details	3/4"= 1'-0"	1/2"=1'-0"
Interior Details	3/8"= 1'-0" to 1/2"=1'-0"	1/2"=1'-0"
Lighting/ Electrical/ HVAC/ Plumbing Plans	1/4"= 1'-0"	1/8"=1'-0"

FLOOR PLANS

A floor plan is an aerial plan view that is horizontally cut approximately 4 feet above the floor (Figure 25). It is considered the most important architectural drawing that presents significant amount of information on the design and construction. It includes wall, door, window, stair, appliance, equipment, cabinetry, and built-in interior elements. A floor plan is drawn to a scale (see Typical Scales for Plans) with different line weights and line types to deliver different levels of information clearly. For instance, dotted/hidden lines are

used to indicate the items that are located above the cutting line such as upper cabinets, upper part of stairway, openings, soffits, or other important upper part of the wall or ceiling features. Ceiling changes can be denoted with dashed lines called out for notes in a small project. Cross referencing symbols are used to relate the information on the floor plan to other drawings such as elevation, section, and detail drawings.

Check list for floor plans. Please use these as a guide where applicable.



1. Border and title block.
2. Title and scale of the drawing in the title block.
3. Drawing number in the title block.
4. North arrow in the upper left corner of the drawing sheet.
5. Exterior walls and interior walls.
6. Outline of patios and porches.
7. Windows with the proper window symbol for operations (sliding? casement?).
8. Doors with the proper door symbol for operations (swinging? folding?).

Figure 25. Concept of floor plan view

9. Wall openings, arches, and soffits with dotted/hidden lines. These should be called out in a note.
10. Ceiling changes with dashed lines in a small project. These should be called out in a note such as FLAT CEILING, CEILING SLOPES DOWN, or CATHEDRAL CEILING PEAK.
11. Window numbers (typically 1/4" diameter circle with 1/8" lettering). Window numbers should match an accompanying window schedule.
12. Door numbers (typically 1/4" diameter circle with 1/8" lettering). Door numbers should match an accompanying door schedule.

13. Room/area/closet labels (typically by using **1/8" lettering**).
14. Stairs with directional arrows for **UP** or **DOWN**.
15. Indicate chimneys.
16. Wheelchair access circles with dashed lines. Also show handrails and grab bars where necessary.
17. All kitchen fixtures and appliances including sinks, counters, cabinets, shelving, range, refrigerator, etc.
18. All bathroom fixtures.
19. Other appliances such as clothes washer, dryer, laundry tubs, water softener, hot water tank, etc.
20. Any built-in interior features.
21. Dimensions.
22. Notations.
23. Title and scale of the plan under the plan view.

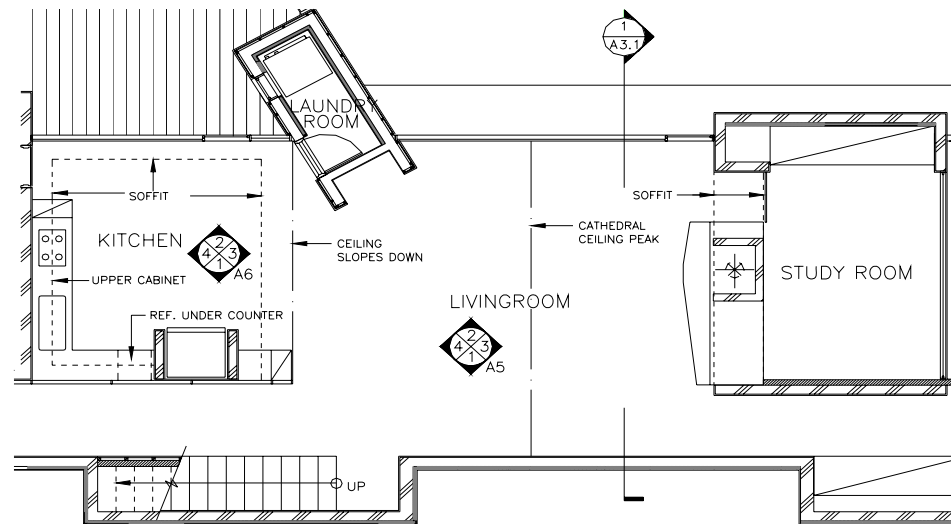


Figure 26. Example of a floor plan

Notations

1. Indicate floor level changes.
2. Indicate ceiling height (for small projects or on the reflected ceiling plan for larger projects)
3. Draw cross-reference symbols such as section, elevation, or detail symbols.
4. Label room names.
5. Label major elements including fireplace, furniture, and shelves.
6. Call out appliances including refrigerator, dishwasher, clothes washer, dryer, and other similar items.
7. Call out small items such as medicine cabinets, grab bars, towel dispensers, mirrors, etc.

Dimension

-Hierarchical dimension placement

Dimension lines are placed hierarchically in 2 to 3 levels of overall dimension; wall dimension; and opening dimension (Figure 27). Overall dimensions are outermost dimension lines, and measure from outside edge to outside edge. Wall dimensions are the next dimension lines towards the plan, showing exterior wall or interior partition locations.

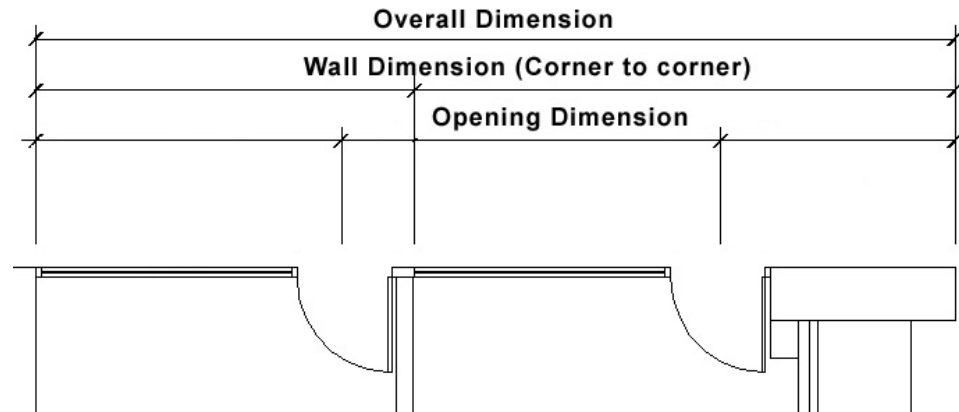


Figure 27. Hierarchy of dimension

The closest dimension lines to the plan, opening dimensions, indicate window, door, and other opening locations. These three

hierarchical dimension lines are placed 1/2" from each other. The innermost dimension, the opening dimension, are 1" to 1-1/2" away from the plan, never touching it.

-Dimension technique

The text of the dimension is always written on the top or left of the dimension line. Extension lines are used to bring the dimension line a distance from the object so it is easily read and not confused as part of the object. The extension line starts about 1/16" from the edge of the object, never touching it. And it extends about 1/8" past the dimension line. At the intersection of the extension line and the dimension line is a "tick." The tick mark on a dimension line is an important detail and crosses at a 45 degree angle at the intersection of the dimension and extension lines. It is typically 1/8" long, however this may vary with the size and scale of a drawing. Use your best judgment, but typically a tick mark is the length of the overlap of the dimension and extension lines (for example if you overlap the lines by 1/8" then the tick mark will be 1/8" in length). The height of dimension text is typically between 3/16" to 1/8", but not below 3/32" when printed. This assures its readability. Dimension text doesn't touch the line. See Figure 28 for an example.

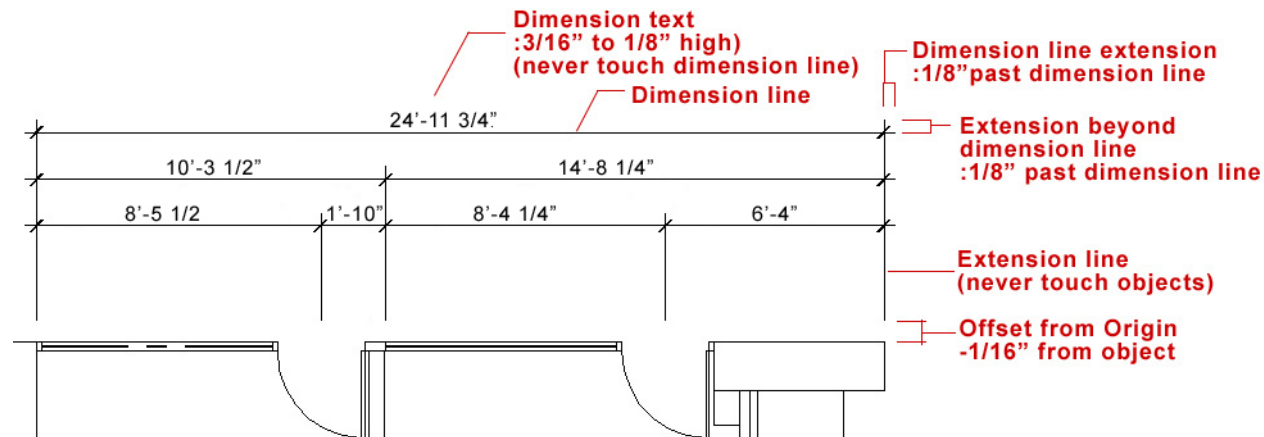


Figure 28. Dimension techniques for floor plans

-Dimensioning angled objects

The location and angle of walls need to be shown with proper dimensioning techniques. To anchor the angled walls as a unique location, they should be measured along both an x and a y axis as in a grid (Figure 29). This way allows construction people to lay out angled walls easily. Perpendicular dimensions to the angled walls may be added to give better dimension information.

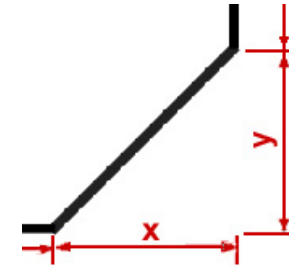


Figure 29. Dimensioning an angled wall

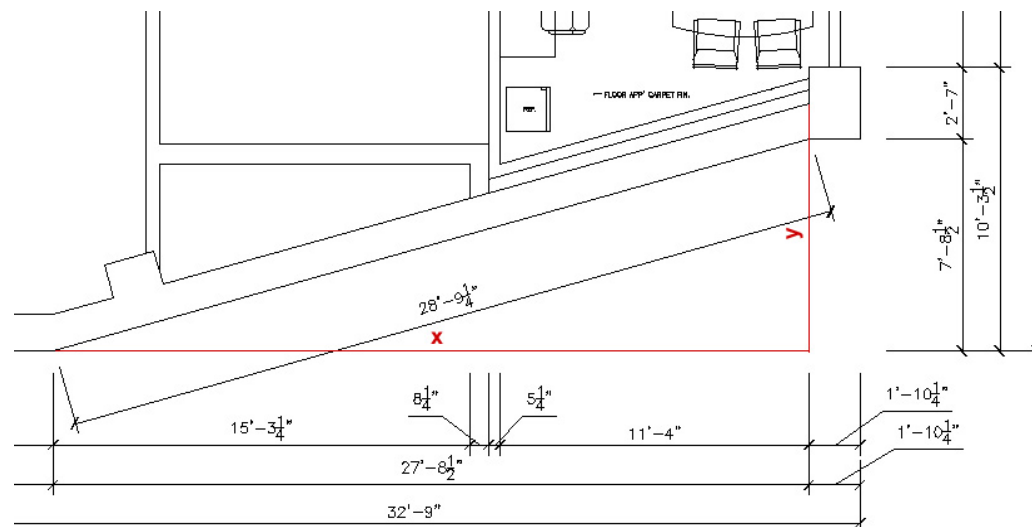


Figure 30. An example of dimensioning an angled wall along an x and a y axis.

-Dimensioning curved objects

The important point in dimensioning a curve is that the builder must be able to replicate the curve from a drawing to the site. To do this, three components should be included: actual curvature, location of center point of the curve, and extent of the curve. The actual curvature is denoted as radius of the curve, which emanates from the center point for the curve. The center point of the curve should be also dimensioned by locating it along x and y axis to anchor the point. The extent of the curve which may be only part of a full circle or half circle should be measured by giving location information on the each end of the curve related to other objects on the drawing.

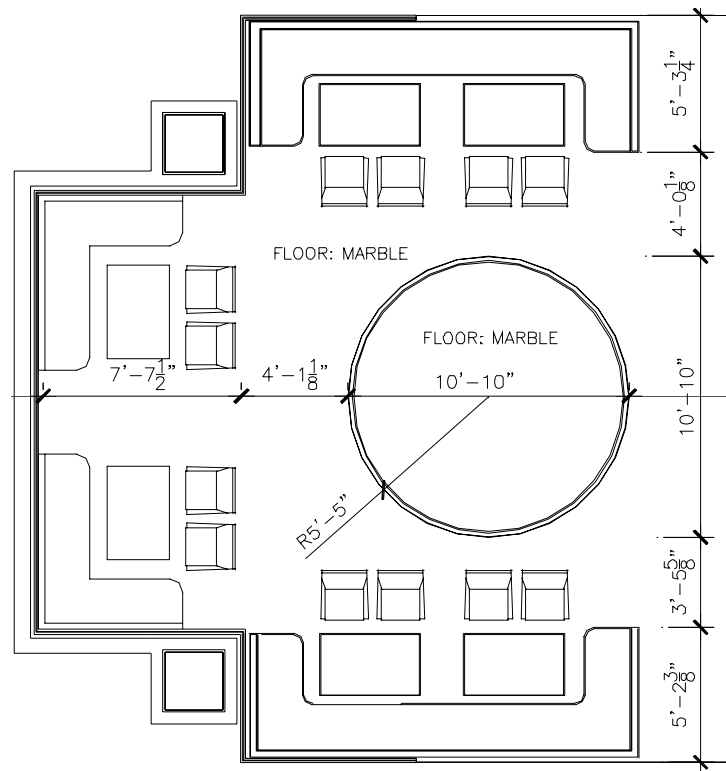


Figure31 Dimensioning a curve

-Dimensioning wood/light-weight gauge steel frame buildings

1. For opening dimension, dimension window/exterior door opening/interior partition locations from the outside face of studs to the center of the openings/ interior partitions (Figure 32).
2. For exterior wall dimension, dimension each wall location from the outside of stud face to the outside of stud face.
3. For interior wall dimension, dimension each wall location from the outside of stud face to the center of the wall, and from the center of the wall to the center of another interior wall.
4. For overall dimension, dimension overall wall locations from the outside of stud face to outside of stud face.
5. Dimension interior walls to structural elements including columns or existing walls.
6. Give angle or radius/diameter where necessary.
7. Dimension built-in furniture/cabinetry.
8. Dimension stairways.

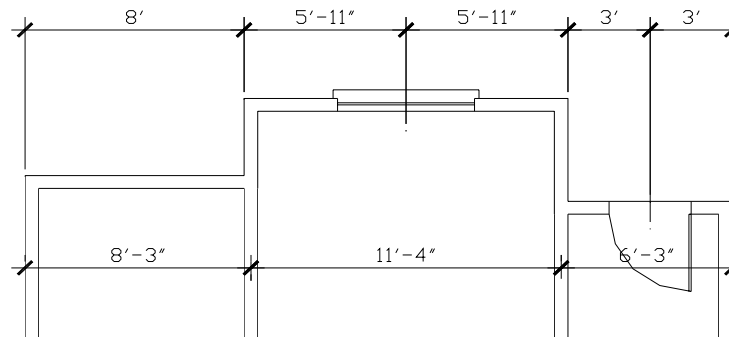


Figure 32. Dimensioning frame buildings

- Dimensioning concrete/ masonry buildings

1. For opening dimension, dimension window/exterior door opening/interior partition locations from the outside of wall facing to the edge of the openings (Figure 33).
2. For wall dimension, dimension each wall location to the outside of faces. But when pilasters or concrete columns are placed, dimension them to their centerline.
3. For overall dimension, dimension overall wall locations from the outside of faces.
4. Dimension interior walls to structural elements including columns or existing walls.
5. Give angle or radius/diameter where necessary.
6. Dimension built-in furniture/cabinetry.
7. Dimension stairways.

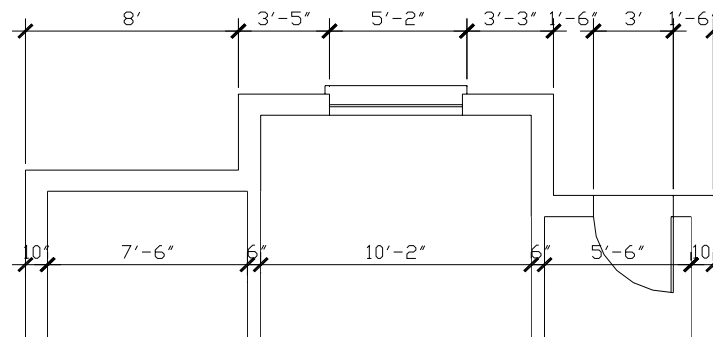


Figure 33. Dimensioning concrete/ masonry buildings

INTERIOR ELEVATION DRAWINGS

An interior elevation is a vertically projected surface inside a building. It provides complimentary information of vertical elements that a plan view cannot describe such as heights of interior elements; vertical materials; and other important vertical information that cannot be shown in other drawings. It is a vertical surface or plane seen perpendicular to the viewer's picture plane (Figure 34). Separate elevation drawings are required for all different walls since elevations drawn looking perpendicular to one side of the building will distort inclined walls of the other side of the building, when a floor plan or object has an irregular shape (Figures 35 & 36)). If an entire building elevation is needed for an irregularly shaped building or object, a distortion on an elevation drawing is necessary (Figure 37). Typical interior elevations show vertical locations of doors, windows, and other openings; profiles of objects; connection to the floor, ceiling, and adjacent objects; material information; and vertical dimensions.

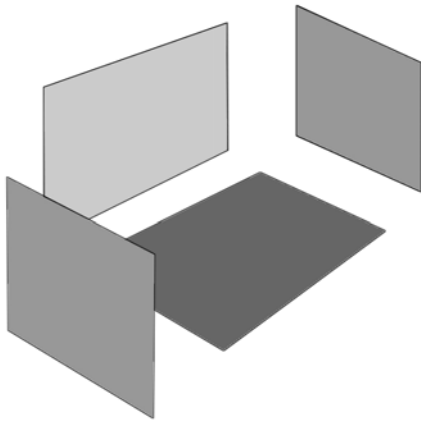


Figure 34 Concept of interior elevations

Decorative elements may be added on interior elevation drawings to indicate important interior design features or to deliver the character of the space, based on the designer's judgment. Adding people can be an effective way to make the space more realistic and to give a relative sense for heights of objects in the space (Figures 38 & 39).

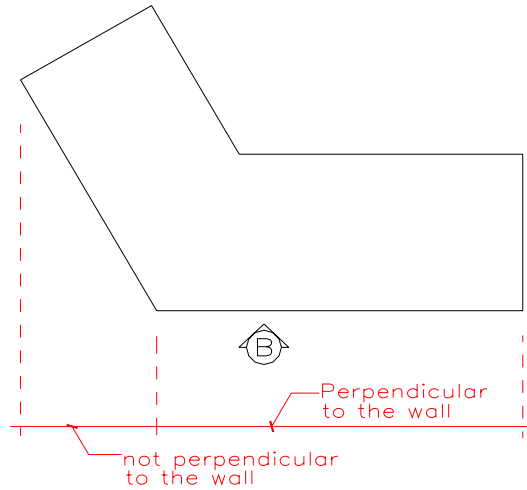


Figure 35. Drawing an elevation drawing for a building in an irregular shape will distort the view.

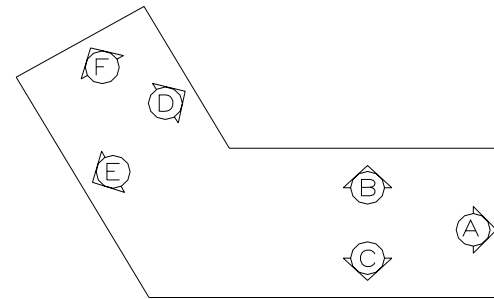


Figure 36. Separate elevation drawings are required for different angled walls to show a perpendicular view to the walls.

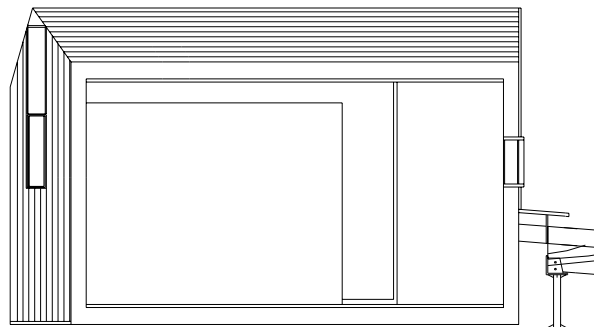


Figure37 Distortion is necessary when an entire building elevation is needed for a building in a irregular shape.

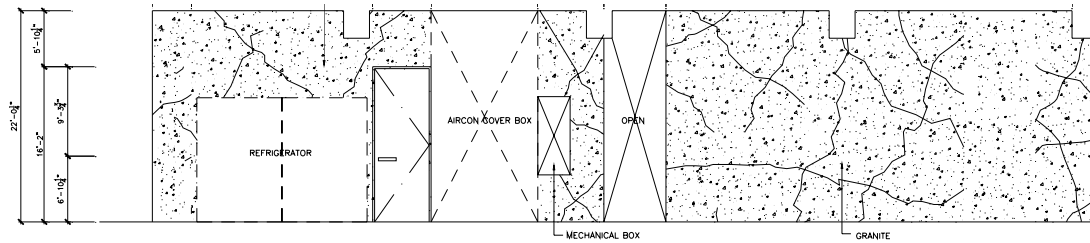


Figure38 A typical interior elevation drawing with material representation



Figure39 Adding people on interior elevation drawings gives a relative sense of object heights

Check list for interior elevation drawings. Please use these as a guide where applicable.

1. Border and title block
2. Title and scale of the drawing in the title block
3. Drawing number in the title block
4. All doors, windows, and frames with proper elevation symbols.
5. All vertical components of the space for all items shown on the plan view including appliances, equipment, and artworks.

6. Door/window/cabinet door opening devices such as door knobs.
7. Angled dash lines near the midpoints of the door/window/cabinetry to indicate the hinge location and door swing.
8. Notations.
9. Dimensions.
10. Title and scale of the elevation under the plan view.

Notation

1. Draw cross-reference symbols such as section or detail symbols (Figure 40).
2. Label room names.
3. Label major elements including fireplace, furniture, and shelves.
4. Call out appliances and equipment including refrigerator, dishwasher, clothes washer, dryer, microwave oven, and other similar items.
5. Call out small items such as medicine cabinet, grab bars, towel dispensers, mirrors, base board, molding, and chair rail.
6. Show proper symbolic representation for each material.
7. Call out finish materials.

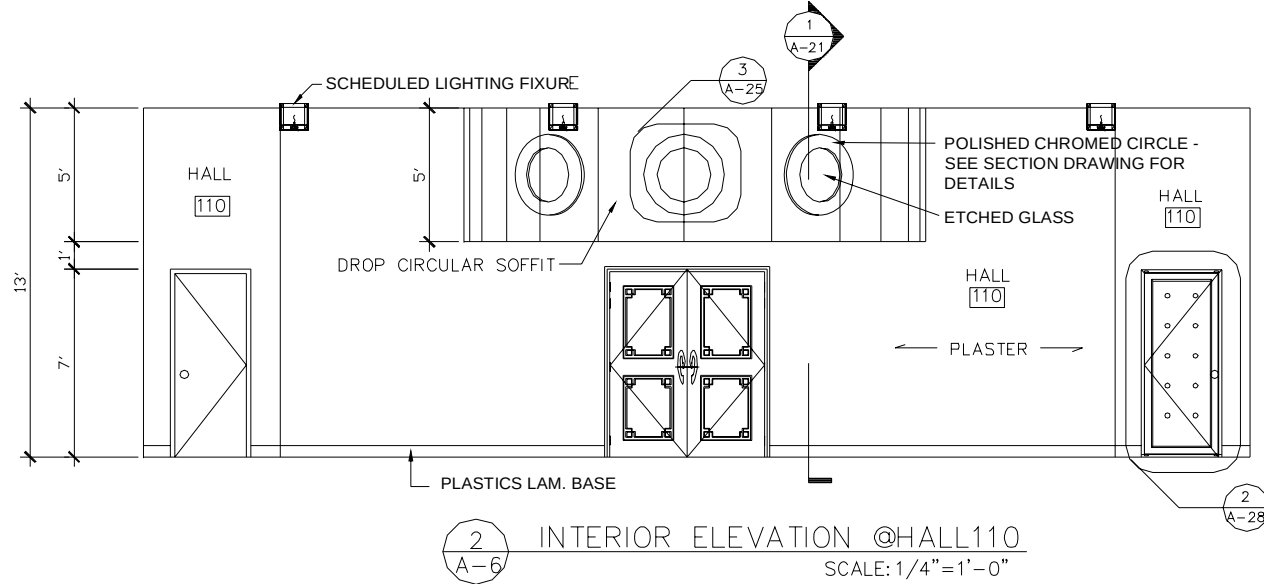


Figure 40. Section and detail symbols shown on an elevation drawing

Dimension

A. Interior Elevation

1. Dimension heights of vertical elements including cabinetry, countertop, soffit, molding, wall panel, railing, grab bar, etc.
2. Dimension heights of doors, windows, and wall openings from the finished floor lines to the tops of these objects.
3. Dimension from finished floor lines to finished ceiling lines.
4. Remember that interior elevations are mainly intended to show vertical heights of walls and other components related to them including doors, windows, millwork, and other important elements. Horizontal dimensions on interior elevations are to show additional information on spaces and elements that are not shown on the floor plan. Some professionals may prefer to place all

horizontal dimensions on the elevations to provide more clarity and convenience for the builders. But it is better not to repeat dimensions in both places, since it increases likelihood of making errors when one drawing or the other is revised.

B. Exterior Elevation

Label the important levels including the bottom of the footing, grade, finished floor line, finished ceiling line, and roof line with the elevation datum symbol. There are two methods to label these vertical dimensions in exterior elevation drawings. One is using a vertical dimension line with horizontal lines that extend out from features lettered parallel to it. Each extension indicates what the feature is with a note on it such as top plate, finished floor, etc (Figure 41). The other is giving the elevation height of each feature from the elevation established for the finished grade of the soil around the building. In this case, elevation datum symbol is associated with each extension line to indicate each elevation height (Figure 42). Vertical distances in exterior elevations typically start above the elevation of the bottom of the footing.

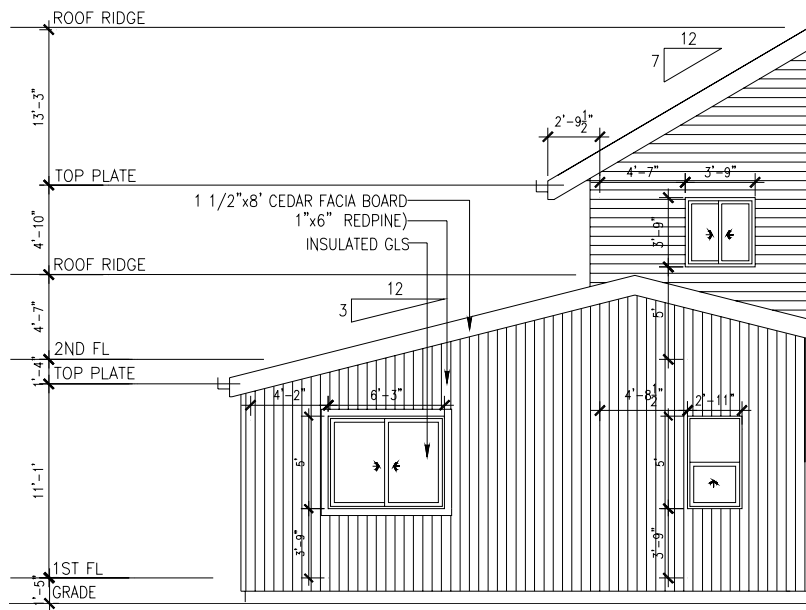


Figure 41. Dimensioning exterior elevations 1

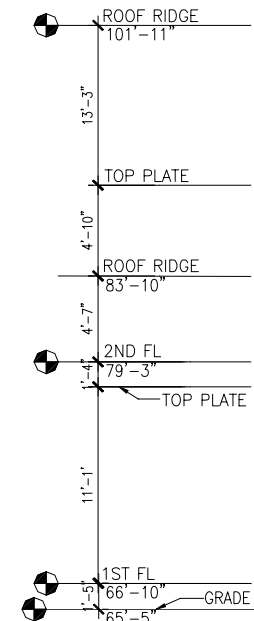
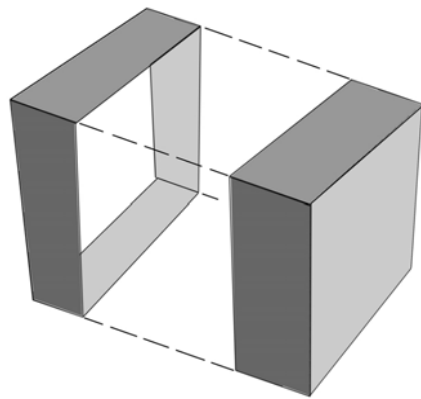


Figure 42. Dimensioning exterior elevations 2

SECTION DRAWINGS

A section drawing is a vertical- cut through of a space or object (Figure 43). Typical section drawings can be drawn of an entire building, individual interior space, or object such as built-in cabinet (Figures 44 & 45). Sections of spaces in interior drawings are sometimes confused with interior elevations and details.



Section drawings for spaces may illustrate similar items as elevation drawings. But section drawings are different from elevation drawings in that they are primarily intended to show the construction of the wall, floor, ceiling, or the object being cut through. Sections aim to show relationships of how different parts are constructed together in a space rather than the items attached to walls. So, a section drawing also presents the construction elements that create the boundaries of spaces, while as an elevation drawing focuses on the characteristics of the surfaces of the boundaries represented as single lines on the drawing. When a cut-through line is very close to the objects, not inside the objects, it usually gets to illustrate vertical shapes as shown on elevation drawings, causing confusion between a section and elevation.

Figure 43 Concept of section drawings

When sections are cut through small portions of a space or object, they are often referred to as section details or details. However, a section drawing is different from these drawings in that a section drawing typically refers to a drawing that cuts through a single space, many spaces on a single floor, or an entire building. Detail drawings are not always drawn in section and may include an enlarged drawing of the floor plan or elevation (See Figure 47 Interior Detail Drawings).

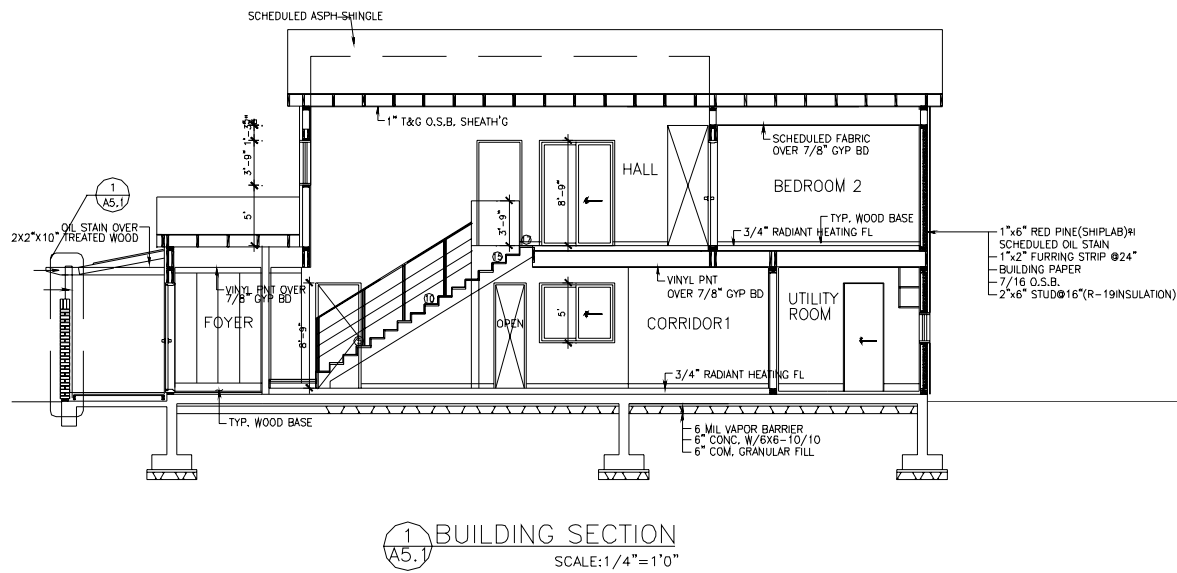


Figure 44. A section of an entire building. It illustrates the relationship between the entrance, stairs, and upper loft of the building.

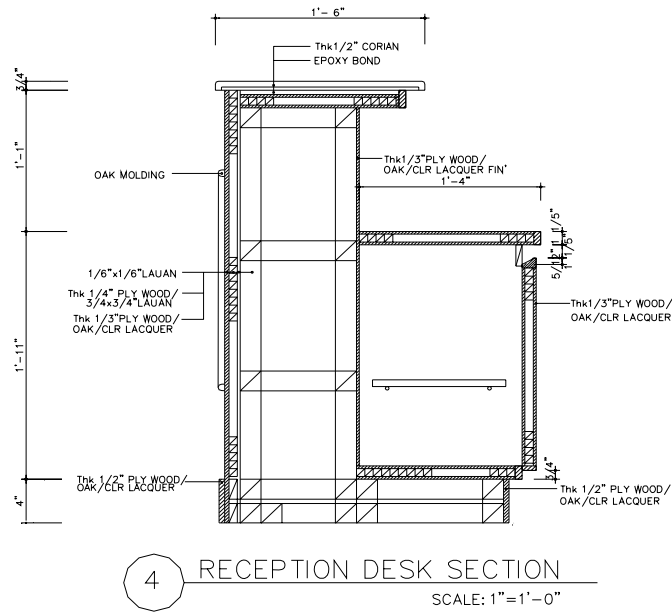


Figure 45. A section of a built-in cabinet.

Check list for section drawings. Please use these as a guide where applicable.

1. Border and title block
2. Title and scale of the drawing in the title block
3. Drawing number in the title block
4. For a building section, show construction details of floors, wall, and ceiling/roof.
5. For a section of an interior space, it may be similar to a combination of a building section and an interior elevation. Emphasize on rather the interior aspects of the construction details such as cabinetwork, wall panels, dropped soffits, or suspended ceilings rather than structural details.
6. Show items drawn on the floor plan including furniture, cabinetry, appliances, equipment, etc.
5. Notations.
6. Dimensions, usually only vertical dimensions.
7. Title and scale of the elevation under the plan view.

Notation

1. Draw cross-reference symbols such detail symbols.
2. Label room names.
3. Label major elements including fireplace, furniture, and shelves.
3. Call out appliances and equipment including refrigerator, dishwasher, clothes washer, dryer, microwave oven, plumbing fixtures, and other similar items.
4. Call out small items such as medicine cabinet, grab bars, towel dispensers, mirrors, base boards, moldings, chair rails, etc.
5. Show proper symbolic representation for each material.
6. Call out finish materials.

7. Specify substitute construction materials.

Dimension

1. Dimension important levels such as footing, grade, finished floor lines, finished ceiling lines, top plate, or ridge of the roof in the outside of the section.
2. Dimension heights of vertical elements of doors, windows, and wall openings either in the outside or inside of the section.
3. Dimension any built-in features or any elements that need to show construction details.
4. Dimension clearances, and alignment.
5. As on interior elevations, sections are primarily concerned with vertical heights, too. Indicate horizontal dimensions only for things that are not informed on the floor plan.

INTERIOR DETAIL DRAWINGS

Interior detail drawings illustrate small portions of a space or object at a large scale. They are intended to accurately show materials and finish application. Detail drawings are not always drawn in section and may include an enlarged drawing of the floor plan or elevation (Figure 46). Section details provide information on the location and construction of different parts, the relationships of these parts to the surroundings, and the juncture of materials. Details are referenced from plan, elevation, and section drawings.

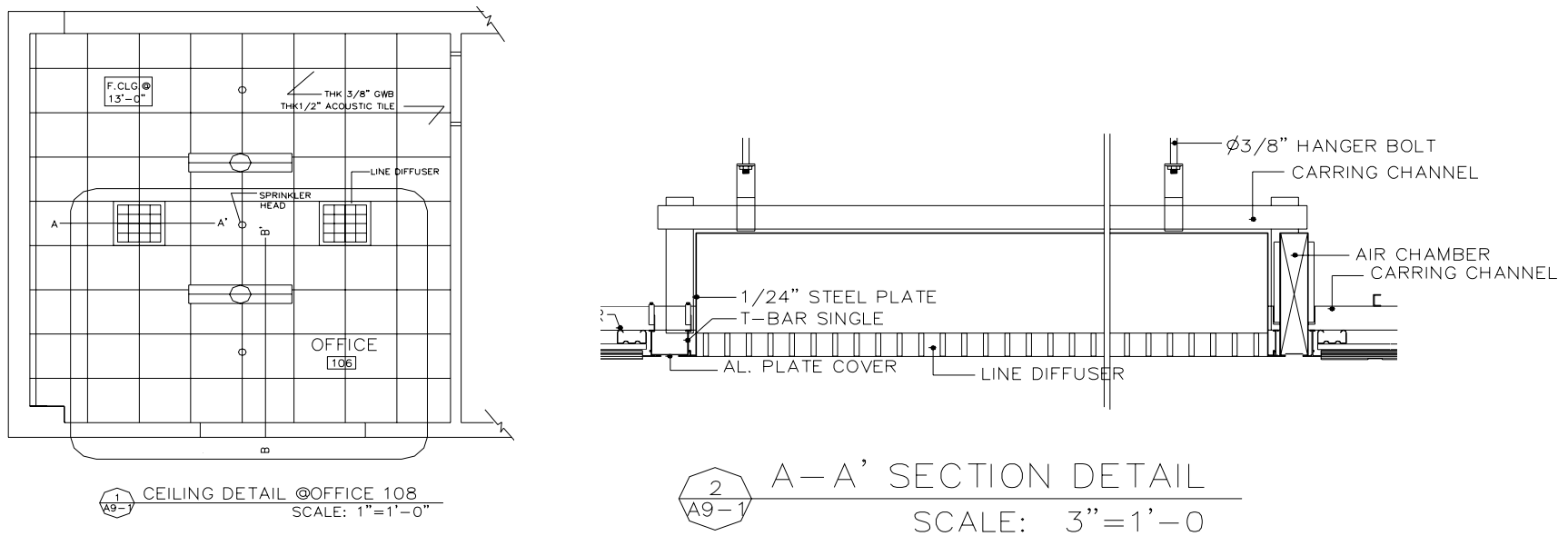


Figure 46. Detail drawings with an enlarged plan drawing of part of the ceiling

SCHEDULES

Interior design drawings contain huge amounts of information that is needed for other people involved in the project such as consultants, contractors, and builders. But all the information needed is hard to be illustrated effectively on the actual drawings. Some information is best communicated in the form of specifications, and other information in schedules.

A schedule refers to a tabular form with rows and columns of data to effectively organize information. Schedules deliver deeper information than can be shown on the actual drawings, but not as deep information as in specifications. Schedules must be clear and easy to read. Although the format of schedules may vary among design firms, typical schedules are drawn in grid lines spaced either 3/16 or 1/4 inch apart, but no less than 3/16 inch for readability. The height of lettering is either 3/32 or 1/8 inch.

Common types of interior schedules include finish schedule, door schedule, window schedule, and FF+E schedule.

Door Schedule

Doors are identified by a number of other designations shown on the floor plan (Figure 47). These are referenced to a door schedule that contains more detailed information about each door. Door schedules consist of two parts. The first part is in a tabular form, and the second part is a graphic representation of each type of door. In a residential or small project, doors are marked with each number for the type of doors on the floor plan, not with door numbers defined by room numbers. For instance, a door marked with number 1 means the door type 1. Door schedules for residential or small projects or relatively contain less information than big projects or commercial projects. A typical residential door schedule in a table contains the mark, number (quantity), size (nominal size), type of door, material, and remarks (Figure 48). It is commonly followed by a graphic representation of door types such as door elevations (Figure 49). Door elevations in a graphic representation form are drawn at a $1/4"=1'-0"$ scale in general and may include dimensions.

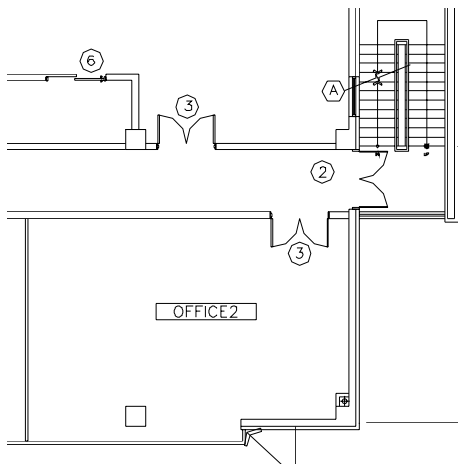


Figure 47. Door marks on floor plan

DOOR SCHEDULE					
MARK	NO	SIZE	TYPE	MATERIAL	REMARKS
1	2	6'-0" x 6'-8" x 1 3/4"	PANEL	W'D, BIRCH	NATURAL FINISH
2	5	3'-0" x 6'-8" x 1 3/4"	PANEL	W'D/FABRIC	INSULATED DOOR
3	2	3'-0" x 6'-8" x 1 3/4"	PANEL	W'D/GLS	1/4" TEMPERED GLS
4	2	3'-0" x 6'-8" x 1 3/4"	FLUSH	W'D	MT'L PT

Figure 48. A typical door schedule for a small or residential project.

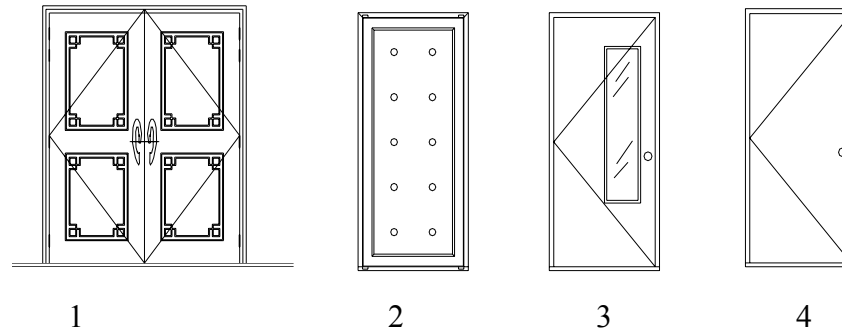


Figure 49. A typical graphic representation of door schedule below the table.

More complicated door schedules may contain the mark, number (quantity), door opening size (nominal), door type, door material, frame material, frame finish, and remarks (Figure 50).

DOOR SCHEDULE							
MARK	NO	DOOR OPENING			FRAME		
		SIZE	TYPE	MATERIAL	MATERIAL	FINISH	REMARKS
1	2	6'-0" x 6'-8" x 1 3/4"	PANEL	W'D, BIRCH	W'D	SS	NATURAL FINISH
2	5	3'-0" x 6'-8" x 1 3/4"	PANEL	W'D/FABRIC	MT'L	PT	INSULATED DOOR
3	2	3'-0" x 6'-8" x 1 3/4"	PANEL	W'D/GLS	MT'L	PT	1/4" TEMPERED GLS
4	2	3'-0" x 6'-8" x 1 3/4"	FLUSH	W'D	MT'L	PT	

Figure 50. Another type of door schedule for a small or residential project.

In a commercial or big project, door numbers are defined by the room numbers. Typically the door numbers are the same as the room number, or marked with an additional number or letter for a more complicated project. For instance, 100-1 or 100-A can be used for the first door in a room with the room number 100, 100-2 or 100-B for the second door, and so forth. More detailed information is necessary including door number, door type number, door opening size, door type, door material, door finish, frame type, frame material, frame finish, frame hardware, frame fire rating, and remarks (Figure 51).

DOOR SCHEDULE											
DOOR NO.	DOOR TYPE	DOOR OPENING				FRAME					
		SIZE	TYPE	MATERIAL	FINISH	TYPE	MATERIAL	FINISH	HARDWARE	RATING	REMARKS
①	2	3'-0" x 6'-8" x 1 3/4"	PANEL	W'D/FABRIC	ST	HM1	MT'L	PT1	SET #2	20 MINUTES	HARDWARE MUST MEET 20 MINUTE RATED DOORS
②	1	6'-0" x 6'-8" x 1 3/4"	PANEL	W'D, BIRCH	ST	HM1	MT'L	PT1	SET #1	3/4"HOUR	HARDWARE MUST MEET 3/4 MINUTE RATED DOORS
③	1	6'-0" x 6'-8" x 1 3/4"	PANEL	W'D, BIRCH	ST	HM1	MT'L	PT1	SET #1	3/4HOUR	HARDWARE MUST MEET 3/4 MINUTE RATED DOORS
④	4	3'-0" x 6'-8" x 1 3/4"	FLUSH	W'D	ST	HM2	MT'L	PT2	SET #3	NONE	
⑤											

Figure 51. A commercial door schedule

Besides a table and a graphic representation of the door type, a commercial door schedule also contains notations for general notes, each door type, door finish, frame type, frame finish, hardware, or detail drawings for different types of doors or frame constructions. An abbreviation key should be provided when abbreviations are used such as WD (wood), ST (Stain), or MT'L (Metal) in door schedules.

Window Schedule

Window schedules are similar to door schedules in terms of organization and lay out. As doors, windows are identified by a number of other designation shown on the floor plan (Figure 52). These are referenced to a window schedule that contains more detailed information about each window. Window schedules also consist of two parts. The first part is in a tabular form, and the second part is a graphic representation of each type of window. A graphic representation of window types is typically window

elevations drawn at a 1/4"-1'-0" scale. Windows are marked with each alphabetical letter for the type of windows on the floor plan. For instance, a window marked with letter A means the window type A. A typical door schedule table for a residential project has a briefer form than a commercial project, because residential windows are very standard and the information for installation may not be necessary. The items in a typical window schedule for a small or residential project include the mark, number (quantity), unit size, rough opening size, type of window, material, finish, glazing (type of glass) and remarks (Figure 53).

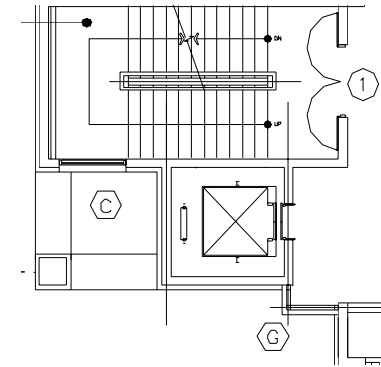


Figure 52. Window marks on floor plan

WINDOW SCHEDULE								REMARKS
MARK	NO	SIZE	ROUGH OPENING	TYPE	MATERIAL	FINISH	GLAZING	
A	2	6'5" x 6'	6'5-1/2" x 6'0-1/2"	FIXED	ALUM	BRONZE	5/8" CLEAR TEMPERED	
B	5	5' x 1'2"	5'0-1/2" x 1'2-1/2"	FIXED	DO	DO	5/8" CLEAR TEMPERED	
C	2	8' x 11'	8'0-1/2" x 11'0-1/2"	FIXED	DO	DO	5/8" INSUL	ENGY EFF GL
D								
E								

Figure 53. A typical window schedule for a residential project.

Window schedules in a commercial project are more complicated than a residential project due to various types and materials of windows. The items include the mark, number (quantity), manufacturer & style, model number, size of window, rough opening, window type, material, finish, glazing (type of glass) and remarks (Figure 54).

WINDOW SCHEDULE										
MARK	NO	MANF. STYLE	MODEL NO.	SIZE	ROUGH OPENING	TYPE	MATERIAL	FINISH	GLAZING	REMARKS
A	2	MARVIN/ ARCHITECT SERIES	WD354	6'5" x 6'	6'5-1/2" x 6'0-1/2"	FIXED	ALUM	BRONZE	5/8" CLEAR TEMPERED	
B	5	MARVIN/ ARCHITECT SERIES	WD342	5' x 12"	5'0-1/2" x 1'2-1/2"	FIXED	DO	DO	5/8" CLEAR TEMPERED	
C	2	MARVIN/ ARCHITECT SERIES	WD323	8' x 11'	8'0-1/2" x 11'0-1/2"	FIXED	DO	DO	5/8" INSUL	ENGY EFF GL
D										
E										

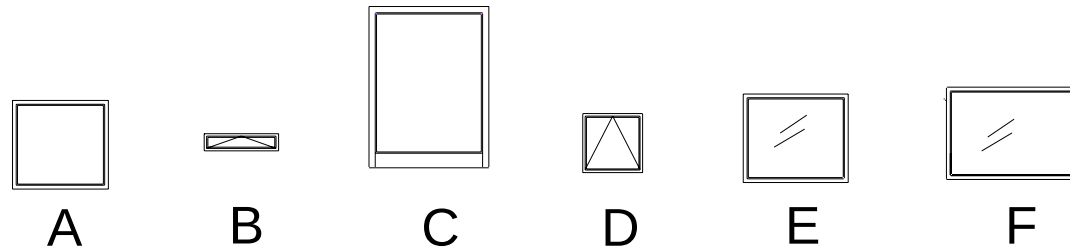


Figure 54. A typical window schedule for a commercial project including a table and window elevations

Interior Finish Schedule

An interior finish schedule provides information on the finish materials to be applied to each wall, ceiling, floor surface, and base in a tabular form. Interior finish schedules typically include a tabular form. In a big commercial project, the second part may be added, which is the legend or materials key, if separate finish plans are not provided. Residential finish schedules are briefer than commercial finish schedules since residential finishes are more likely to be common. Commercial projects usually use a much wider range of interior finish materials and need a more complex interior finish schedule. The items in a typical interior finish schedule for a

small or residential project include room name, floor material, base material, wall material, ceiling material, ceiling height, and remark (Figure 55). More sub- items can be added to each surface item when different materials are applied to one of the surfaces. For instance, the wall item may include sub items such as north wall, east wall, south wall, or north wall, when different wall finishes are applied to different walls.

ROOM FINISH SCHEDULE						
ROOM NAME	FLOOR	BASE	WALLS	CEILING	CEILING HEIGHT	REMARKS
FOYER	CERAMIC TILE	6" CERAMIC TILE	PAINT	PTD. GYP. BD	8'-8"	
LIVING ROOM	HARDWOOD	4" WOOD	WALLPAPER	PTD. GYP. BD	8'-8"	COFFERED CEILING
FAMILY ROOM	NATURAL CORK	4" RUBBER	WALLPAPER	PTD. GYP. BD	8'-8"	
DINING ROOM						

Figure 55. A typical interior finish schedule for a residential project

The items for a commercial project include mark (room number), room name, floor material, base material, wall material, ceiling material, ceiling height, and remarks. Each surface item lists all the specific finishes that are planned to be applied in the project. Among these materials, the material that will be used in a specific room is checked. For instance, the floor item may include materials such as carpet1, carpet2, vinyl tile1, and vinyl tile 2 for the project, and the carpet1 may be marked as a floor material for the Room 101 (Figure 56).

ROOM FINISH SCHEDULE																			
MARK	ROOM NAME	FLOOR				BASE		WALLS				CEILING		CEILING HEIGHT	REMARKS				
		CARPET1	CARPET2	VINYL TILE1	VINYL TILE2	CERAMIC TILE	4" VINYL	WOOD	CERAMIC TILE	WALLPAPER	PAINT1	PAINT2	PAINT3	CERAMIC TILE	PTD. GYP. BD1	PTD. GYP. BD2	ACOUS. TILE		
101	OFFICE1	○					○				○						○	9'-0"	SEE COLOR SCHEDULE
102	OFFICE2	○					○				○						○	9'-0"	DO
103	OFFICE3		○				○					○					○	10"-0"	DO
104																			

Figure 56. A typical interior finish schedule for a commercial project

Furnishing, Furniture, and Equipment (FF+E) Schedule

Specifying, ordering, and placing FF+E is an integral part of interior designer's job. To inform installation which FF+E will be placed where correctly, a separate drawing called the FF+E plan or FF+E installation plan may be created. In a small project, furniture selection may be noted in each place where furniture is shown on the FF+E furniture plan. But in a large commercial project, an organized schedule is necessary to show FF+E information in a clear way. Each furniture is identified by the keys shown on the furniture plan, which are referenced to the furniture schedule. A typical FF+E schedule contains information of mark, number (quantity), manufacturer and catalog number, description, fabric, finish, and remarks (Figure 57). The marks are in the form of codes that indicate generic types of furniture. For instance, C means chair, and T means table. In a more complicated project, the code may be a combination of letters and numbers to provide more detailed information such as T07/101. In this case, T indicates table, 07 refers to the 7th type of table for the project, and 101 after the slash means the room number where this table will be located.

FF+E SCHEDULE						
MARK	NO	MFG'R/CATALOG NO	DESCRIPTION	FABRIC	FINISH	REMARKS
C1	87	KNOLL 300-128	OFFICE CHAIR 25-1/2"W,21-1/4"D,16"-21"H	KNOLL TEXTILES/ CHOPSTICKS/JADE	DARK GREEN	CLASS A FLAME SPREAD FABRIC
C2	52	HERMAN MILLER LCH200-1654	OFFICE CHAIR 25-1/2"W,21-1/4"D,16"-21"H	HERMAN MILLER TEXTILES CHOPSTICKS/JADE	BLACK	CLASS A FLAME SPREAD FABRIC
T1	25	FALCON PRODUCTS	CUSTOM WOOD TABLE TOP 62" DIA. ROUND	SOLID MAPLE TOPS	NATURAL STAIN	BASE TB BRUSHED CHROME- SEE LISTING UNDER TB
T2						

Figure 57. A typical FF+E schedule

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