

Study Session

3

Basic Code Enforcement, Chapters 5 through 7

Reading Construction Documents, Performing a Plan Review and Conducting Inspections

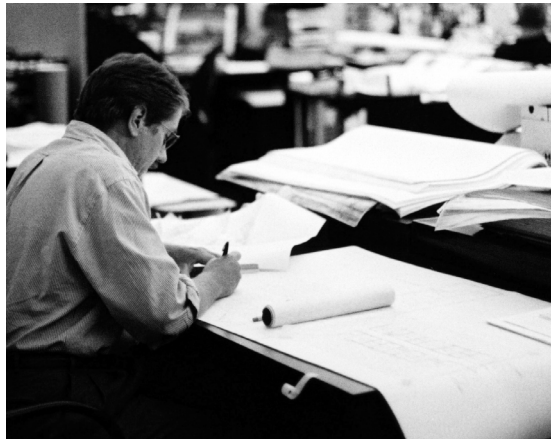
OBJECTIVE: To become familiar with the technical aspects of code enforcement: first, by learning to recognize the basic construction documents necessary for a building plan review; then, by examining the construction documents for compliance with zoning ordinances and building code requirements; and finally, by learning the various types of inspections and the procedures for verifying code compliance.

REFERENCE: *Basic Code Enforcement, Chapters 5 through 7*

- KEY POINTS:**
- What are construction documents?
 - What are some typical architectural symbols and abbreviations?
 - What are some of the typical views in a set of architectural plans?
 - What scales are used for the various elements in a set of plans?
 - What are specifications and engineering details?
 - What is the purpose of plan review?
 - What are the responsibilities of the building official, the plan reviewer and the inspector in respect to building plan review?
 - Why is a plan review record necessary?
 - What code requirements must generally be checked during building plan review?
 - Why inspect a building?
 - What are the various types of inspections?
 - What is the typical sequence of inspections during the course of construction?
 - Why is it important to document inspections?
 - What are field correction notices and notices of violation?
 - How are complaint inspections handled?

Text: *In order for the building official to determine that proposed construction is in compliance with code requirements, it is necessary that sufficient information be submitted for review. This information typically consists of drawings and specifications describing the proposed work. These are the construction documents. Construction documents is the term that replaces the less descriptive “plans and specifications” used in earlier codes.*

Discussion and Commentary: Construction documents assist the staff of the Building Safety Department in determining if a building or structure is in compliance with the jurisdiction’s regulations. The Zoning Department will review the site plans for compliance with minimum setbacks and other zoning regulations. The building plans examiner will review the submitted building plans to see if the project complies with maximum height and area, means of egress, light and ventilation, HVAC, plumbing, electrical, structural, accessibility and fire suppression/detection. The specifications will also be reviewed to determine types of materials, window and door hardware and other detailed information not shown on the plans. Structural calculations and soils reports may also be submitted as part of the construction documents.



Drawings are graphic representations of the proposed work and serve to illustrate the physical relationship of materials to each other, including sizes, shapes, quantity, locations and connections. Drawings also include schedules of structural elements, equipment, finishes and similar items.

Specifications are written descriptions which specify the qualitative requirements for products, materials and workmanship for the proposed work, including installation, testing and performance criteria.

It is important that those responsible for accepting construction documents, typically permit technicians, ensure that a complete submittal is received. Otherwise those that are conducting the review will not be able to properly complete their tasks, which will result in delays.

Topic: Symbols and Abbreviations**Category:** Reading Construction Documents**Reference:** *Basic Code Enforcement*, 5.3**Subject:** Architectural Material Symbols

Text: *When the building official reviews construction documents to determine if a proposed building conforms to the building code, he or she will be reading architectural symbols which are pictorial representations of construction materials. Properly identifying the materials being represented is essential to determine construction materials being proposed for use.*

Discussion and Commentary: In addition to architectural symbols, standard abbreviations are used to describe various structural, architectural and mechanical systems. Abbreviations assist in keeping the plans less cluttered. Plans should include a legend that will identify what each of the abbreviations represents.

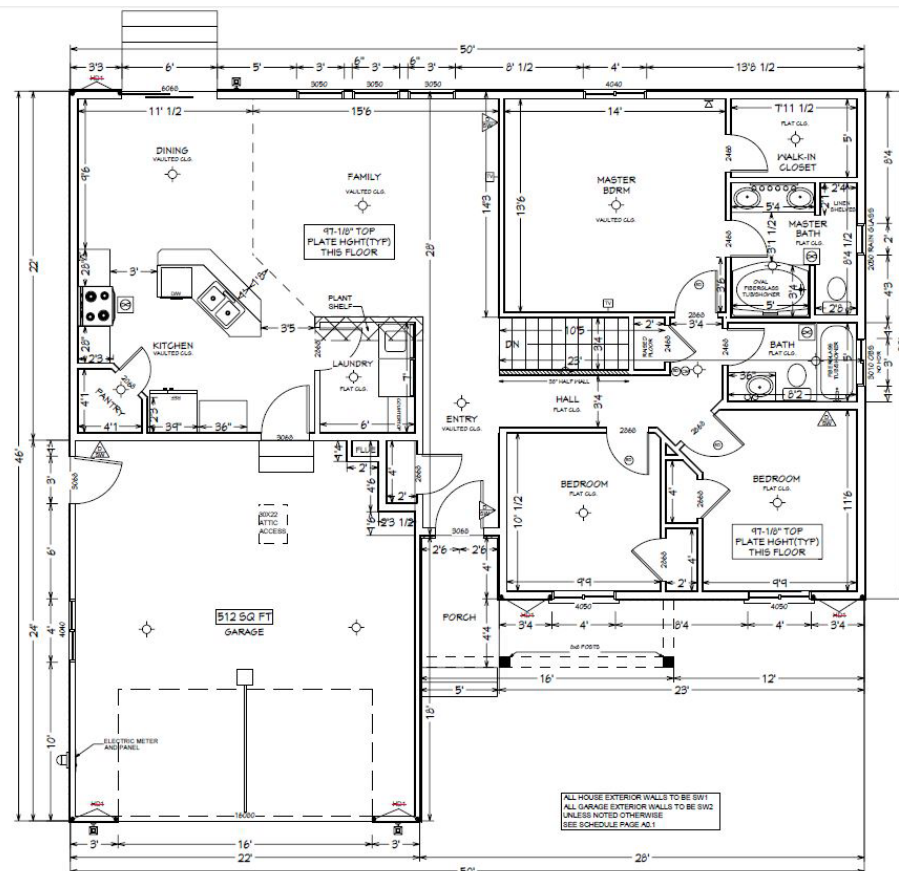
Legend

Above finished floor	AFF	Lavatory	LAV
Anchor bolt	AB	On center	OC
Concrete masonry unit	CMU	Polyvinyl chloride	PVC
Diameter	DIA	Property line	PL
Elevation	ELEV	Roof drain	RD
Finished floor level	FFL	Smoke detector	SD
Footing	FTG	Square feet	SQ FT or SF
Foundation	FDN	Switch	SW
Gypsum wallboard	GWB	Underwriters Laboratories	UL
Height	HT or HGT	Weatherproof	WP
Junction box	JB	Welded wire fabric	WWF

Some abbreviations such as ftg, fdn, dia, sf and oc are fairly typical whereas others such as ffcl, (finish floor change line), apc (as per code) and cbif (carpenter-built in field) may be unique to a specific set of plans. A legend is often necessary for an accurate review of the plans.

Text: In the context of construction documents, the term “plan” applies to various types of architectural and engineering drawings that are used by the builder, building official and plan reviewer. But it has another meaning, too. When speaking of the various elements of architectural drawings, “plan” refers to the way we are looking at, or viewing, the proposed construction. The “plan view” shows the proposed construction as if it were being viewed from above.

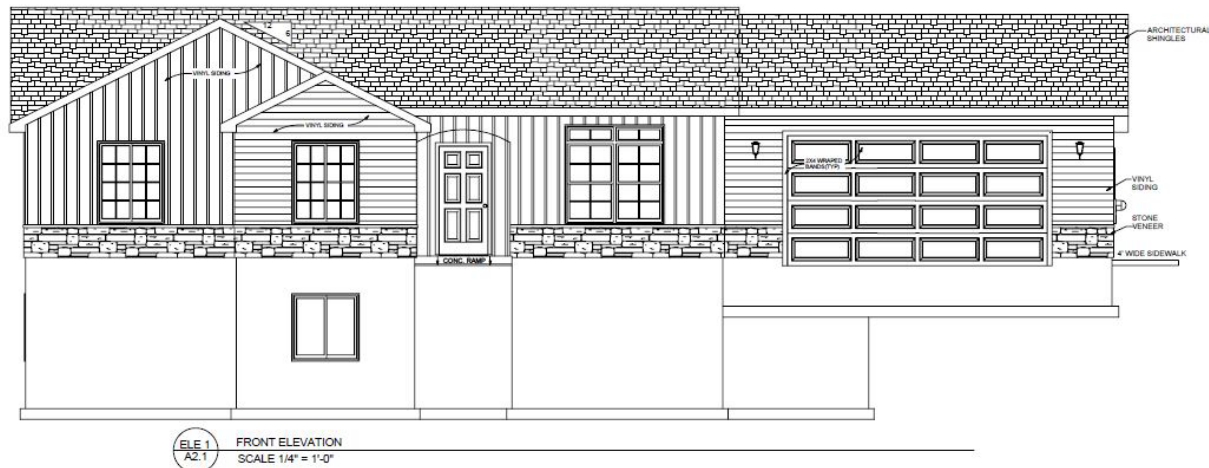
Discussion and Commentary: Floor plans are probably the most important of all construction documents because they represent the layout, dimensions and uses of the rooms and include window locations, beams and header locations, plumbing fixtures and other required information. Certain areas on the floor plan may be circled to indicate that there will be a detailed drawing of the area located on the Details page of the plans.



Basic projects such as room additions may also show electrical receptacles, lights and switches, plumbing lines and heat ducts on the floor plan instead of on separate drawings for each type of work. Furniture and other movable items do not typically need to be shown on a floor plan.

Text: *Another way of viewing the proposed construction is to stand on the ground and look at it. This is called the elevation view. Exterior elevation views may be viewed from the front, sides and rear. The designer prepares elevations views to help the builder visualize the proposed construction from the outside.*

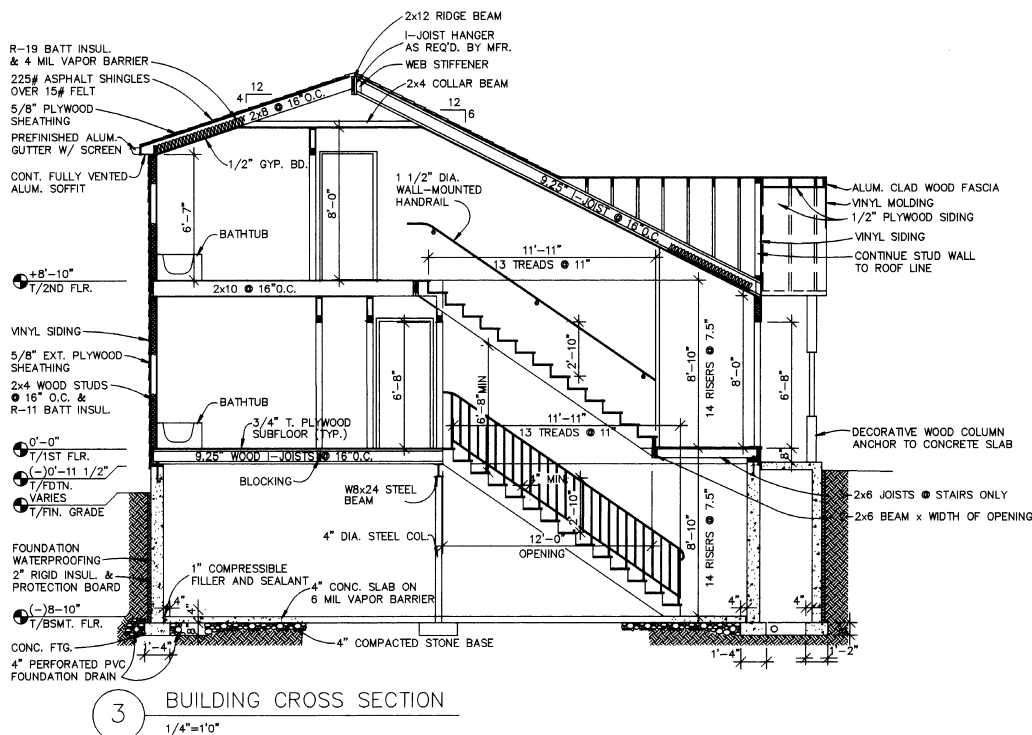
Discussion and Commentary: If a building section view is similar to the open side of a dollhouse, an elevation drawing would be similar to looking at the front or the sides of a dollhouse. Like the cover of a jigsaw box, it shows what the project is intended to look like once it is completed.



On some elevation drawings, the designer may show lines indicating where the various floor levels (basement, crawl space, first, second, attic) may occur. This is helpful when a project has multiple floor levels.

Text: A building section is a cutaway view of the entire building or portion of the building. Building sections are sometimes called longitudinal sections or transverse sections. A longitudinal section is cut through the long axis of the structure and a transverse (or cross) section is cut through the short axis. In practice, the terms "section" and "cross section" are used interchangeably, and may be either longitudinal or transverse.

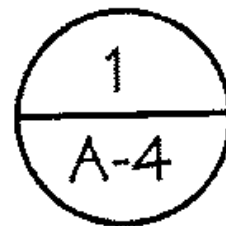
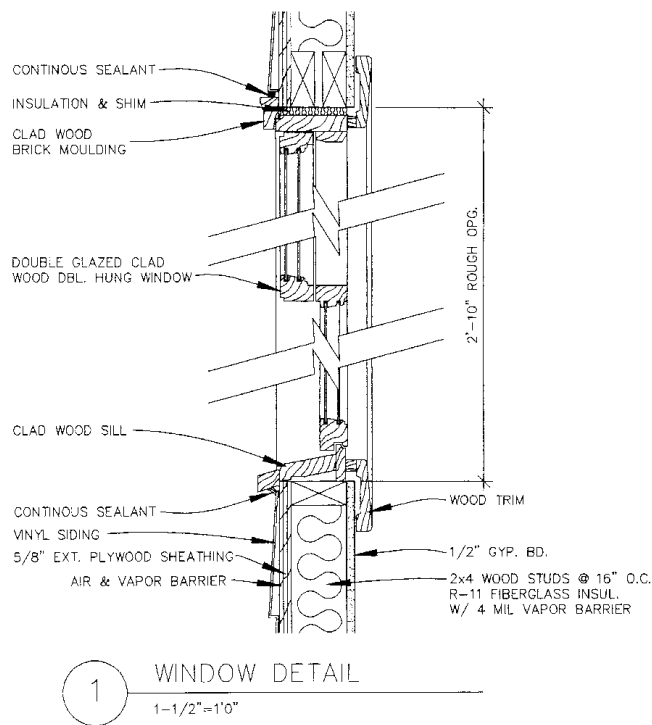
Discussion and Commentary: Although a building section may be drawn at $\frac{1}{4}" = 1'-0"$, most detailed section drawings are drawn at a larger scale than floor plans, such as $\frac{1}{2}" = 1'-0"$, so greater detail can be shown. These drawings can show various connections, anchorage, header and beam details, thicknesses of finish materials (drywall and exterior coverings), wall and roof sheathing type and thickness, flashing and other information that would not be depicted on a floor or foundation plan. The floor plans should indicate the location where the sections are taken.



Section drawings are important because they show the builder, plans examiner and inspector in detail how certain aspects of the building will be connected or framed in. They also show various dimensions pertaining to window and door heights as well as ceiling heights.

Text: Detail drawings show a building element on a larger scale, and therefore in much greater detail and accuracy than can be conveyed on the building plan or section drawings. This level of detail provides information necessary for the correct installation of an element of the building.

Discussion and Commentary: Typically, the designer will circle certain areas on the floor plans to indicate that there are blow-ups or details. The circled area on the floor plan will be labeled to indicate what the detail number is and on what page the detail will appear. This is known as a reference symbol. (See below.)



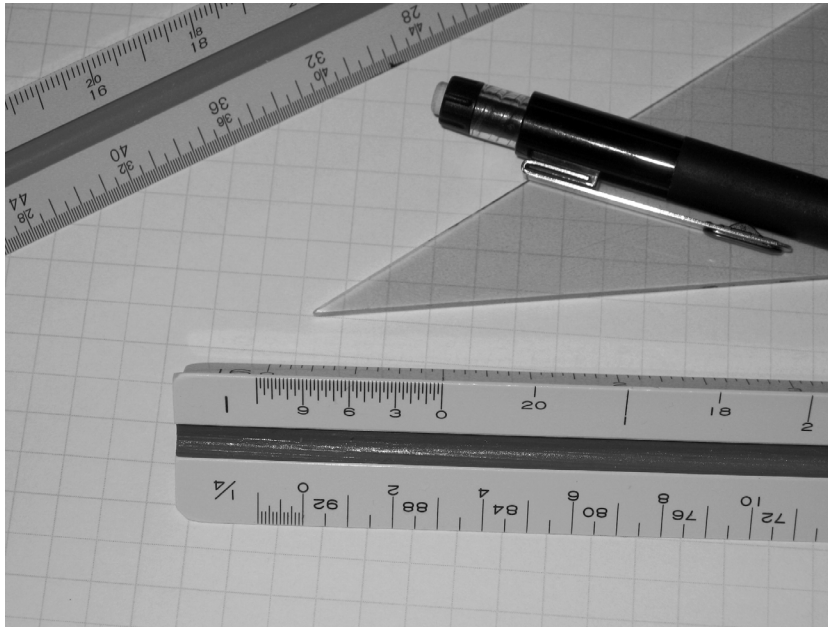
Reference Symbol

Typical details will show connections at wall and foundation, roof and wall, stairways, structural elements such as beam connections, window/door headers and any other areas that may need special attention during building or inspection.

Topic: Use of Scales**Category:** Reading Construction Documents**Reference:** Basic Code Enforcement, 5.5**Subject:** Drawing to Scale

Text: *Drawing to scale has the advantage of showing various elements in correct proportion to one another and helps the user accurately visualize completed construction. The scale may also be used to approximate dimensions for estimating or area calculation purposes, for example. However, the scale should not be used to figure out critical dimensions. Instead, the dimensions indicated on the drawings should be used. If a dimension is missing, it can often be determined by adding and subtracting other dimensions that are given on the drawings.*

Discussion and Commentary: Most floor plans, elevations and foundations plans will be drawn at $\frac{1}{4}" = 1'-0"$. This scale is usually sufficient to view these types of plans. However, for clarity, many details will use a larger scale so that drawing will be larger and capable of showing more specifics. For example, the window detail on the previous page was drawn at $1\frac{1}{2}" = 1'-0"$.



Most site plans are drawn using an Engineer's Scale. This type of scale is broken down in increments of tenths of a foot. Example: 20.5' would equal 20'-6" and 20.75' would equal 20'-9".