

# Terminology and Symbols: Civil Engineering

**A** DESIGN is developed as a solution to a problem. Civil engineers and drafters can use a design brief to help solve project problems. Plot and plat drawings are then created that communicate important information about the design. A range of information is available on civil engineering drawings, including setbacks, elevations, and property lines.



## Objective:



Summarize the ways civil engineers use design briefs, drawings, line types, and symbols.

## Key Terms:



building lines  
compass bearings  
contour lines  
design brief  
elevations

engineer's scale  
lengths  
plat  
plot  
point of beginning (POB)

property lines  
setback distances

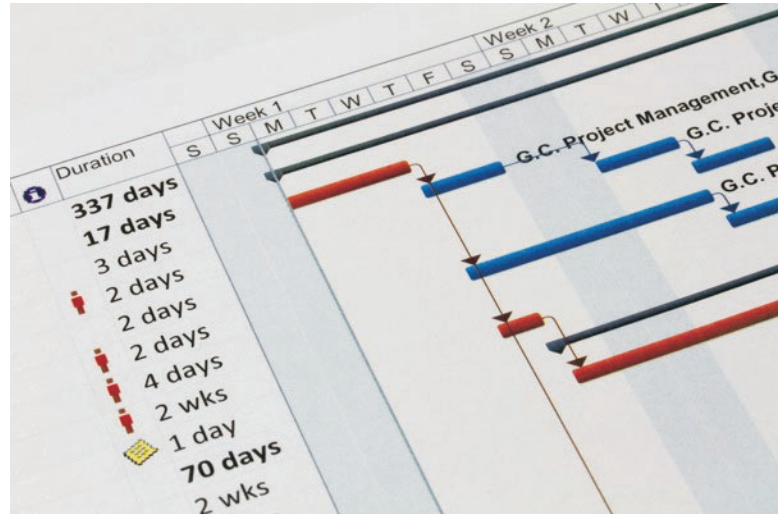
## Understanding Civil Engineering Applications

Various documents and criteria are essential when dealing with civil engineering applications. Being familiar with the purpose of certain documents will assist you tremendously.

## DESIGN BRIEF

A **design brief** is a document used to focus the efforts of a designer and to outline the client's needs. Although it states the parameters of the project, in most cases, the client would still expect the designer to provide a creative solution. Various types of design briefs exist, and the actual content can range depending on the project and the specific type of design. A design brief is a planning document necessary to clarify:

- ◆ What the project must achieve, including needs, objectives, and priorities
- ◆ How the project would be achieved; the criteria for success
- ◆ The project timeline, including budgets



**FIGURE 1.** A design brief outlines the project so everyone knows what they must achieve, the priorities, the design criteria, timelines, and budgets. A design brief allows a team to work together.

### Solving Problems

Architects and drafters can solve problems with a design brief by:

- ◆ Using it to state the problem situation as well as any limitations or special conditions
- ◆ Using it to provide specific information about the problem and to tell the designer what must be done
- ◆ Using it to describe what the successful design must accomplish



**FIGURE 2.** Timelines are a proven way to lay out a project and meet deadlines. Goals and due dates are incorporated into a range of data along the design process, including budgets.



## FURTHER EXPLORATION...

### ONLINE CONNECTION: Writing a Project Report/Brief in Construction & Engineering

Engineering projects result in some structure. The effectiveness of the design and its success are driven by the procedures used to design it. A report or brief includes vital information needed to complete the project. To learn more about writing an engineering report or brief, visit the following:

[http://www.ehow.com/how\\_8092361\\_write-report-construction-engineering-projects.html](http://www.ehow.com/how_8092361_write-report-construction-engineering-projects.html)

## CIVIL ENGINEERING DRAWINGS

Civil engineers use many types of drawings in their work to show the features and desired modifications to a piece of land. The two main types of drawings are plat and plot.

### Plat Drawing

A **plat** is a small drawing taken directly from a land survey and includes information about the property, as it currently exists.

### Distances

All major site features have dimensions or distances from one another. These distances and dimensions are used for area calculations.

### Property Lines

**Property lines** are lines that define boundaries of ownership. Local governing bodies typically use property lines to determine where one property begins and another ends.

### Building Locations

The plat drawing provides the exact location of a building or construction project.

### Setback Distances and Building Lines

**Setback distances** and **building lines** are indicators that show how close to the edge of the property construction can take place. Setback distances are regulated by local codes that determine how close to a property line you can build. In contrast, building lines show where a building or construction is located relative to the property lines and setbacks.

### Plot Drawings

A **plot** is similar to a plat, but it shows more finite information.



## FURTHER EXPLORATION...

### ONLINE CONNECTION: Understanding Civil Drawings

Civil engineering drawings are used to describe areas of land. They use coordinates and bearings to locate site features. They also use detailed information about all the curves and bends in roads as well as important dimensional data. To learn more about civil engineering drawings, visit the following:

[http://www.austincc.edu/sgideon/intcad/student\\_guide/unit3/01-LECTURE-Understanding%20Civil%20Drawings.pdf](http://www.austincc.edu/sgideon/intcad/student_guide/unit3/01-LECTURE-Understanding%20Civil%20Drawings.pdf)

### Right of Way

The right of way on civil engineering drawings includes drives and walkways. The right of way allows for access; these areas may be on private or public property. The position and size of drives and walkways are noted on the plot.

### Elevations

**Elevations** are changes in vertical distances above a common point. Important elevations will be noted on the plot numerically with a (+ or -) relative to a bearing point or reference point. The position on the drawing from which all lengths and bearings are measured is the **point of beginning (POB)**.

### Contour Lines

**Contour lines** are lines that show points of consistent elevation. The points along a contour line are all at the same elevation. The spaces between the contour lines indicate a slope or rise in elevation. The amount of slope or rise is consistent between each contour line, and the distance is noted on the drawing.



**FIGURE 3.** Contour lines allow the civil engineer and construction crew to see changes in elevation on a flat two-dimensional drawing. This image is a topographic drawing with contour lines.

## CIVIL ENGINEERING LINE TYPES AND SYMBOLS

Civil drawings are laid out using lengths and compass bearings.

## Compass Bearings

**Compass bearings** are the direction of an object as determined by the compass and begin with a north or a south designation. Examples of how compass bearings are used include:

- ◆ Line A to B (that goes northeast at 30 degrees) is noted as “N 30 degrees E.”
- ◆ Line C to D (that goes southwest at 30 degrees) is noted as “S 30 degrees W.”



**FIGURE 4.** Compass bearings are used to designate the direction of an object on civil engineering drawings.

## Lengths

**Lengths** are measurements expressed in feet and tenths of feet. (This notation is specific to engineering drawings.) Lengths are measured with an **engineer's scale**, which is a device that provides measurements equal to parts per inch and parts per foot; it is used in the design and drawing of surveys. An engineer's scale does not use a regular ruler's notations of  $\frac{1}{2}$  inch or  $\frac{1}{4}$  inch; it divides an inch by tenths.

## Scales and Graduations

Scales are commonly available in 4-, 6-, and 12-inch models and in a variety of graduations (e.g., 10, 20, 30, 40, 50, or 60 parts per inch). Graduations vary based on the application, so scales are also available in graduations of 100, 200, 300, 400, etc., parts per foot. An example is 500.4 feet.

## Line Types

Civil engineering drawings use a set of common line types. Line types you will use include the following:

- ◆ Property lines that define the extent of ownership
- ◆ Contour lines that show the changes in elevation
- ◆ Building lines that show where construction can take place
- ◆ Setback distances—lines that show the distance at which construction can occur from the property lines

## Summary:

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A design brief is a document used to focus the efforts of a designer and to outline the client's needs. Design briefs include the following main topics: needs and objectives, priorities, criteria, timelines, and budgets. Engineers and drafters use design briefs to solve problems. For instance, they use them to state the problem or situation as well as any limitations or special conditions. A brief can be used to provide specific information about a problem and to tell the designer what must be done.

Civil engineers use many types of drawings in their work to show the features and desired modifications to a piece of land. Two main types of drawings include a plat and a plot. A plot includes distances, property lines, building locations, setbacks, and building lines. A plat includes right of way, elevations, and contour lines. Civil drawings are laid out using lengths and compass bearings. Civil engineering drawings use these common line types: property, contour, setback, and building lines.

## Checking Your Knowledge:

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1. What is a design brief?
2. Name and describe the lines used to show points of consistent elevation.
3. Describe the information included on a plat drawing.
4. Describe the information included on a plot drawing.
5. Which line is used to define boundaries of ownership?

## Expanding Your Knowledge:

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A great way to expand your knowledge about drafting and design skills used in civil engineering is to visit an engineering office. Call a local civil engineering or planning office in your area and plan a trip. Schedule your visit, and make sure you have permission to meet with one or more civil engineers to discuss their process and possibly see them in action.

## Web Links:

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### Civil Engineering Design Knowledge and Resources

[http://www.engineersedge.com/civil\\_engineering/civil\\_engineering\\_menu.shtml](http://www.engineersedge.com/civil_engineering/civil_engineering_menu.shtml)

### Classifications of Civil Engineering Drawings and Interpreting Engineering Drawings

<http://praveenniru.hubpages.com/hub/Classification-of-Civil-Engineering-Drawings-and-Importance-of-engineering-drawings>

### Design Process and Design Brief Examples

<http://www.technologystudent.com/designpro/despro1.htm>