Construction Drawings, Symbols and Conventions

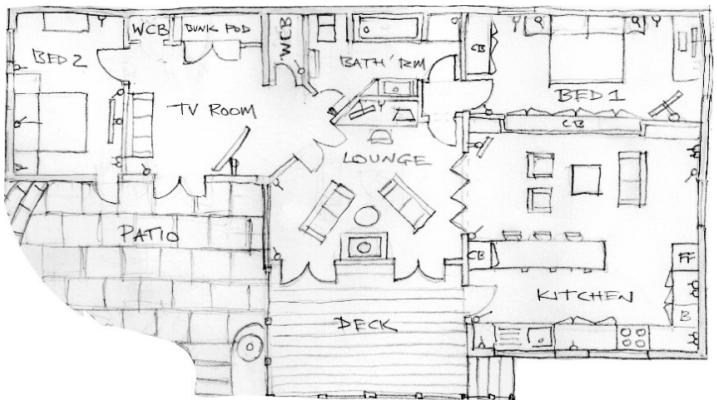
Construction drawing

Several types of specialised drawings are used during building projects. These are known as a **project set**, and include;

- Floor plans
- Site plans
- Location plans
- Elevations
- Sectional views
- Rendered illustrations

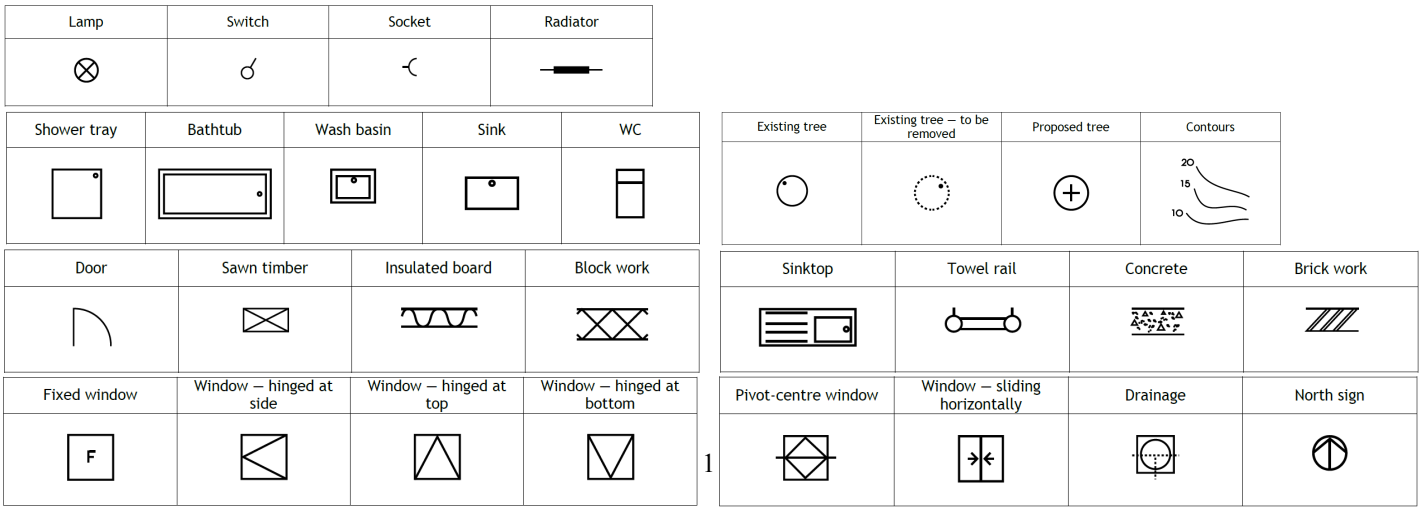
Floor Plan

This type of drawing shows the layout of the rooms inside a building and the position of the doors, windows and important fittings like a bath, sink and toilet. It is viewed from **above** and is used by all trades (bricklayers, plumbers, electricians, and joiners) to plan/ cost their work. Floor plans are generally drawn on a scale of **1:50**.



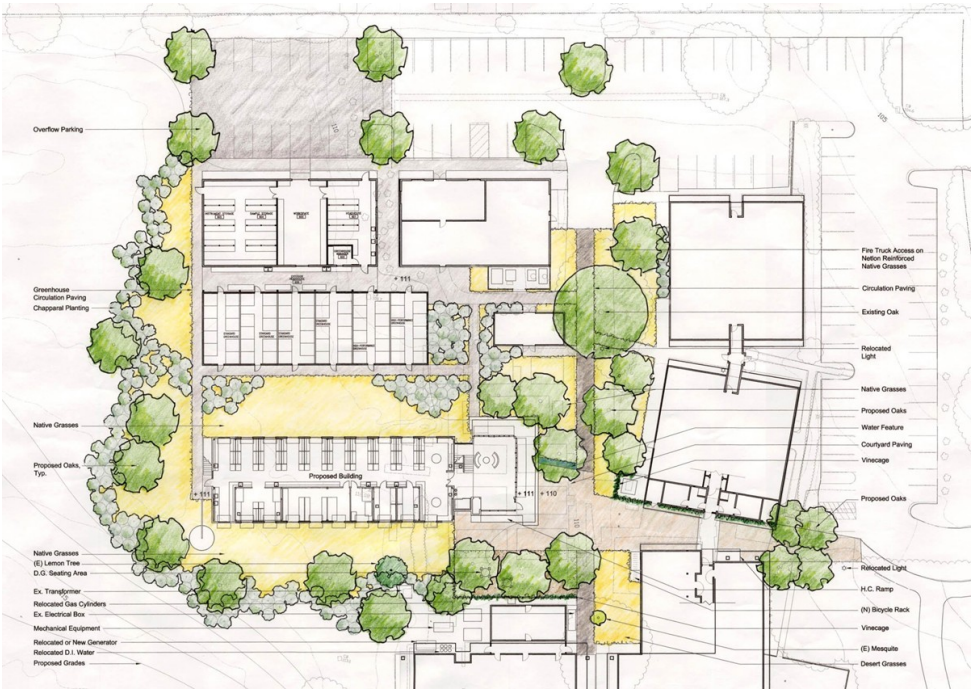
Floor plans may include:

- dimensions and layout of the rooms in the building
- the layout and positions of windows and doors
- the layout of bathroom and kitchen fixtures and fittings
- lights, light switches, electrical sockets, electric cables and fuse boxes
- the layout of water pipes (plumbing)
- the scale of the drawing



Site Plan

This type of drawing is concerned with one or more buildings which are within the same area and shows these buildings within their own **site** (or plot) boundary. The site plan allows the builder to mark out the site before digging trenches for foundations and drains. The scale is normally **1:200** for domestic buildings.



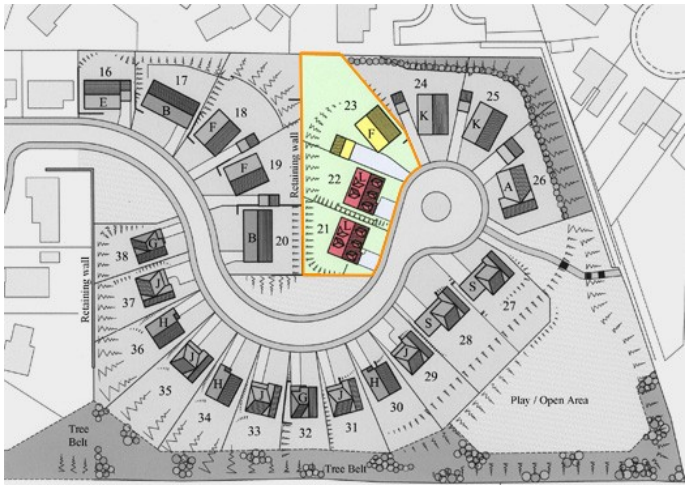
Site plans may include:

- boundaries of the plot
- the position (dimensions) of the building within the plot
- access paths
- drainage information for the removal of waste: pipe runs, manholes and the location of the main sewer
- contour lines to indicate the direction and gradient of sloping ground
- existing trees and the positions of any new trees that are required
- a north direction arrow
- the scale of the drawing

Location Plan

A Location Plan shows where the site is located within the local area. It shows road, outlines of buildings and site boundaries (garden boundaries). A new build in an existing street is highlighted by a thick outline and shading or colour.

The scale is normally **1:1250**.



Location plans include:

- all the neighbouring buildings and their plot boundaries
- street names and house numbers
- roads, pavements, footpaths, parks and fields
- a north direction arrow
- the scale of the drawing

Elevations

The planning department checks that the style of the building is in keeping with the local environment. Elevations are orthographic views of the outside of the building that enable these check to be made. The builder needs information about the style of the roof and the wall finishes while clients and customers also want to know what a building will look like. Elevations can provide this information.

2 Rear Elevation
Scale: 1/4" = 1'-0"

3 Front Elevation Corner Lot
Scale: 1/4" = 1'-0"

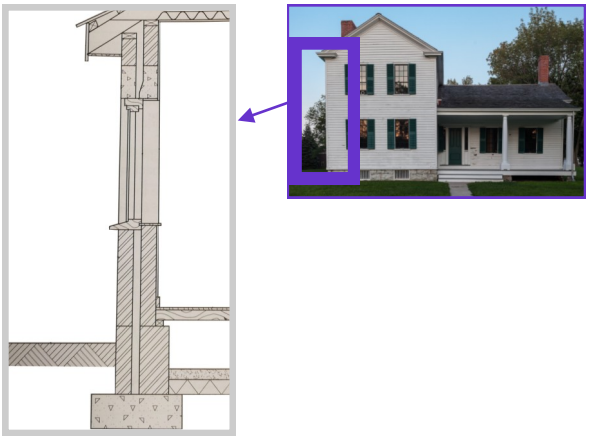
Elevations show:

- the style of the building (bungalow, villa, flat etc.)
- the external proportions of the building
- the external features of the building; window styles and wall finishes etc.
- the type of roof: gable hipped or flat roof
- the position of doors and windows from the outside

The scale is normally **1:100** or **1:50**.

Sections

Sectional views are detailed technical drawings showing a **slice** through a wall. The section is normally taken through a part of the building that will show most detail. In the example shown the section passes through a window. The detail in a sectional view shows the bricklayers and joiners how the building is to be constructed.



The scale is normally **1:20**.

Sections show:

- the material used: brick, engineering block, hardwood, softwood, concrete, insulation board and damp-proof membranes
- Construction details (how the various materials fit together)
- wall construction: brick and blockwork or brick and timber framed
- dimensions (especially heights and wall thicknesses)
- floor and ground levels inside and outside the house
- the design of the foundations and floor
- the design of the eaves
- the type, thickness and position of insulating materials
- the scale of the drawing

Rendered Illustration

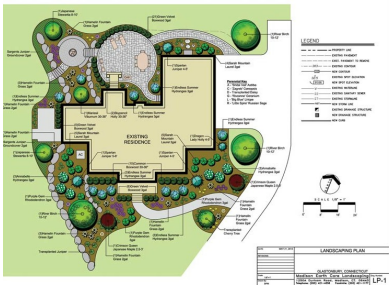
Marketing the property for sale or for renting is a vital part of new building developments. Promotional documents will include illustrations of the proposed houses and floor plans showing the main room dimensions. To maximise the impact and realism, illustrations may be fully rendered and shown in mature surroundings; trees and shrubs are often included.

Promotional graphics will show:

- external views of the building
- coloured and rendered views that are easily understood and appeal to the consumer
- simplified floor plans enabling the consumer to determine which size of house will best suit the family's needs
- a new property in pleasant, mature surroundings
- text that explains the benefits of a particular property but does not get bogged down in technical detail
- prices

The illustrations may not be printed to scale but the proportions will be accurate.

Landscape Architects



Landscape architects create the landscape around us. They plan, design and manage open spaces including both natural and built environments. They work to provide innovative and aesthetically pleasing environments for people to enjoy, while ensuring that changes to the natural environment are appropriate, sensitive and sustainable. Their work can help clients visualise proposals for new designs by;

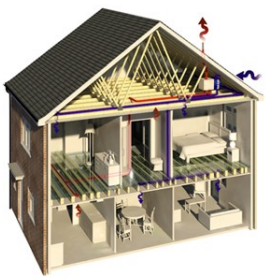
- Showing/communicating the location of different features in gardens, building complexes, open areas etc.
- Helping to visualise the ways in which spaces might be used
- Showing/communicating the materials that might be used in the solid landscaping
- Showing possible colour schemes/colour combinations
- Showing possible planting schemes
- Showing the position of critical features/buildings in relation to other surrounding buildings/areas.

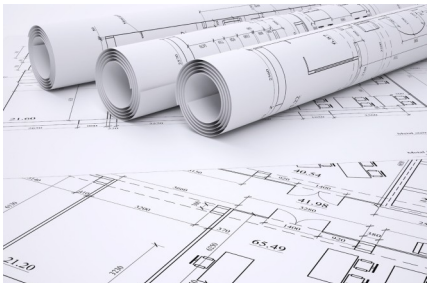
Architectural Technicians

Architectural Technicians use their skills in science and engineering to help bring architects' construction ideas to life. They work on design plans, advise on the best use of building materials and monitor progress of projects. Furthermore, they prepare plans using computer aided design (CAD) software and can work on anything from extensions through to new designs for sports stadiums. Architectural Technicians will produce a variety of graphics, many of which will be used to communicate relevant technical data to the construction trades. Graphics will include information which;

- Shows where structural elements will need to be built
- Shows where energy saving materials and/or features are required
- Indicates where services will be required
- Supports pricing/cost and labour calculations for estimates/bills and quantity
- Indicates where material junctions occur/materials converge or meet

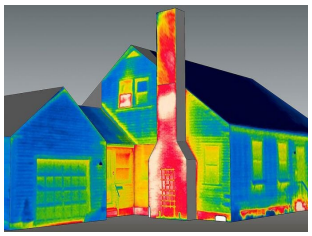
Below are some examples of graphics produced by an Architectural Technician.



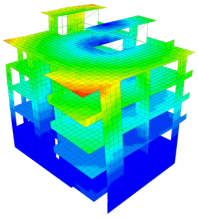


A 3D model of a house could also be used to evaluate aspects of the design, prior to construction. It could be used to calculate, evaluate or determine;

- Flood risk
- The strength of a part of the structure using FEA
- Ventilation and extraction
- Thermal efficiency
- Lighting and illumination levels



Finite Element Analysis (FEA)



FEA is a computational tool for performing engineering analysis. It can predict how a product/structure reacts to real-world forces, vibration, heat, fluid flow, and other physical effects. FEA software can be an excellent tool in construction projects to help make proposed buildings as safe and structurally sound as possible.

Finite Element Analysis is also regularly used in the testing of products. The image below, taken from Inventor software, demonstrates FEA being used on a mechanical feature to determine the level of stress/strain being exerted on individual parts of the assembly. See booklet labelled **Finite Element Analysis** for further information.