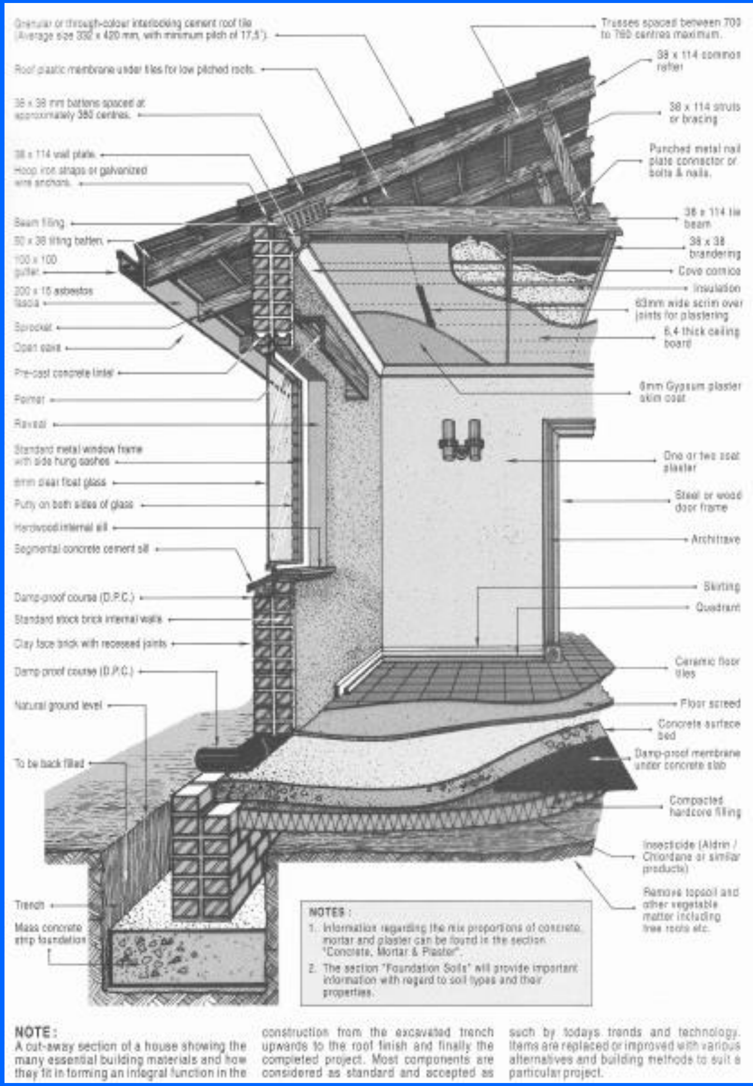
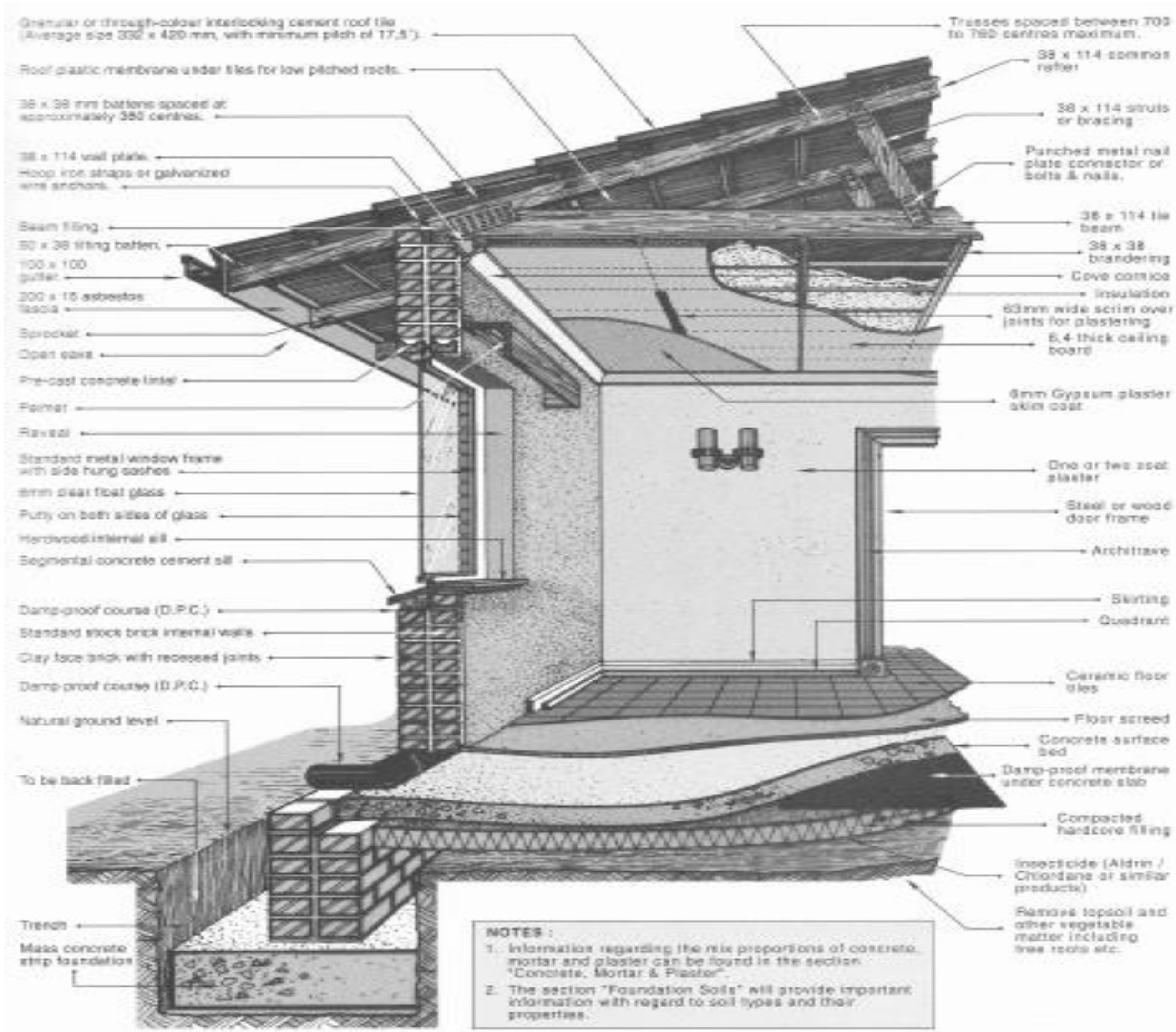
# CIVIL DRAWINGS



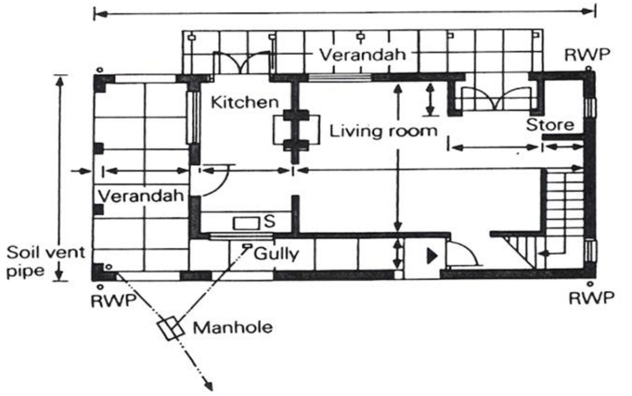

# VERTICAL SECTION THROUGH A DWELLING



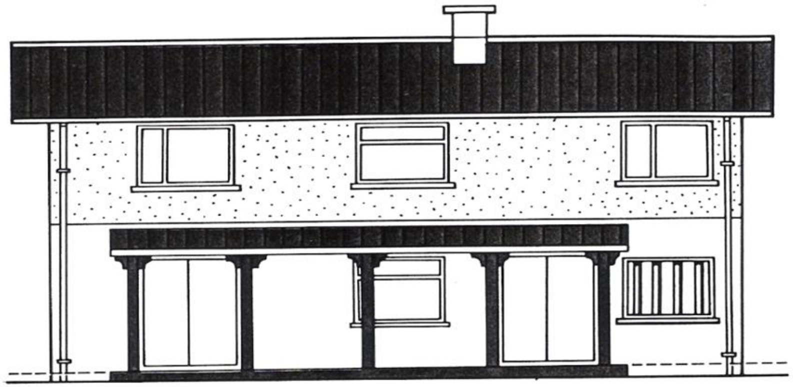

**NOTE:**
A cut-away section of a house showing the many essential building materials and how they fit in forming an integral function in the construction from the excavated trench upwards to the roof finish and finally the completed project. Most components are considered as standard and accepted as such by todays trends and technology. Items are replaced or improved with various alternatives and building methods to suit a particular project.

# PLANS

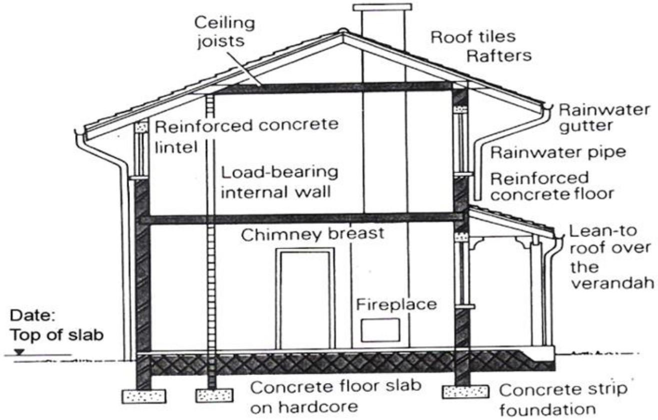
1. SITE PLAN
2. FLOORPLAN
3. ELEVATIONS
   3.1. NORTH
   3.2. SOUTH
   3.3. EAST
   3.4. WEST
4. SECTION ELEVATION




An example of a ground-floor plan for a house.

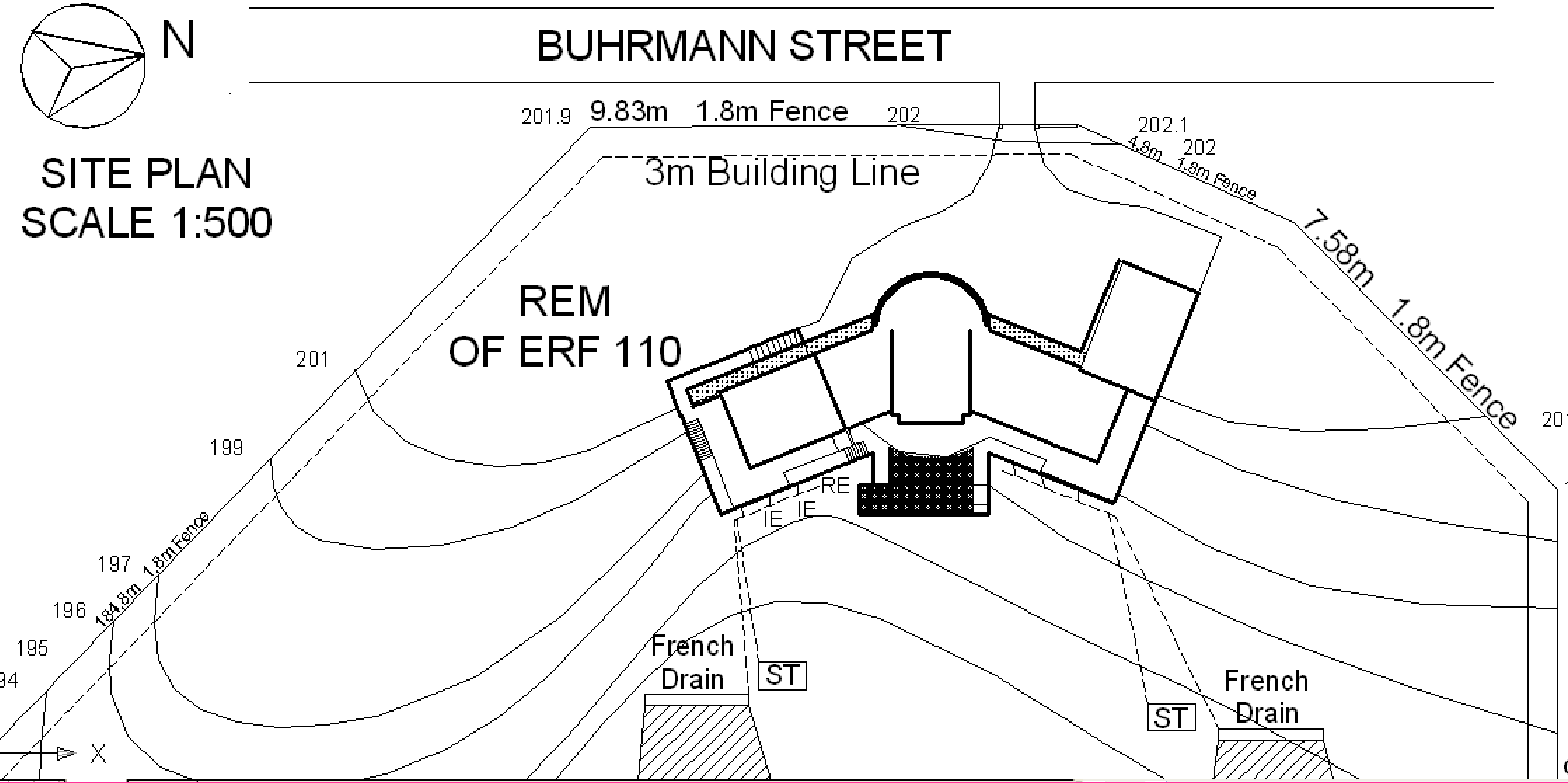


The east elevation of a house.



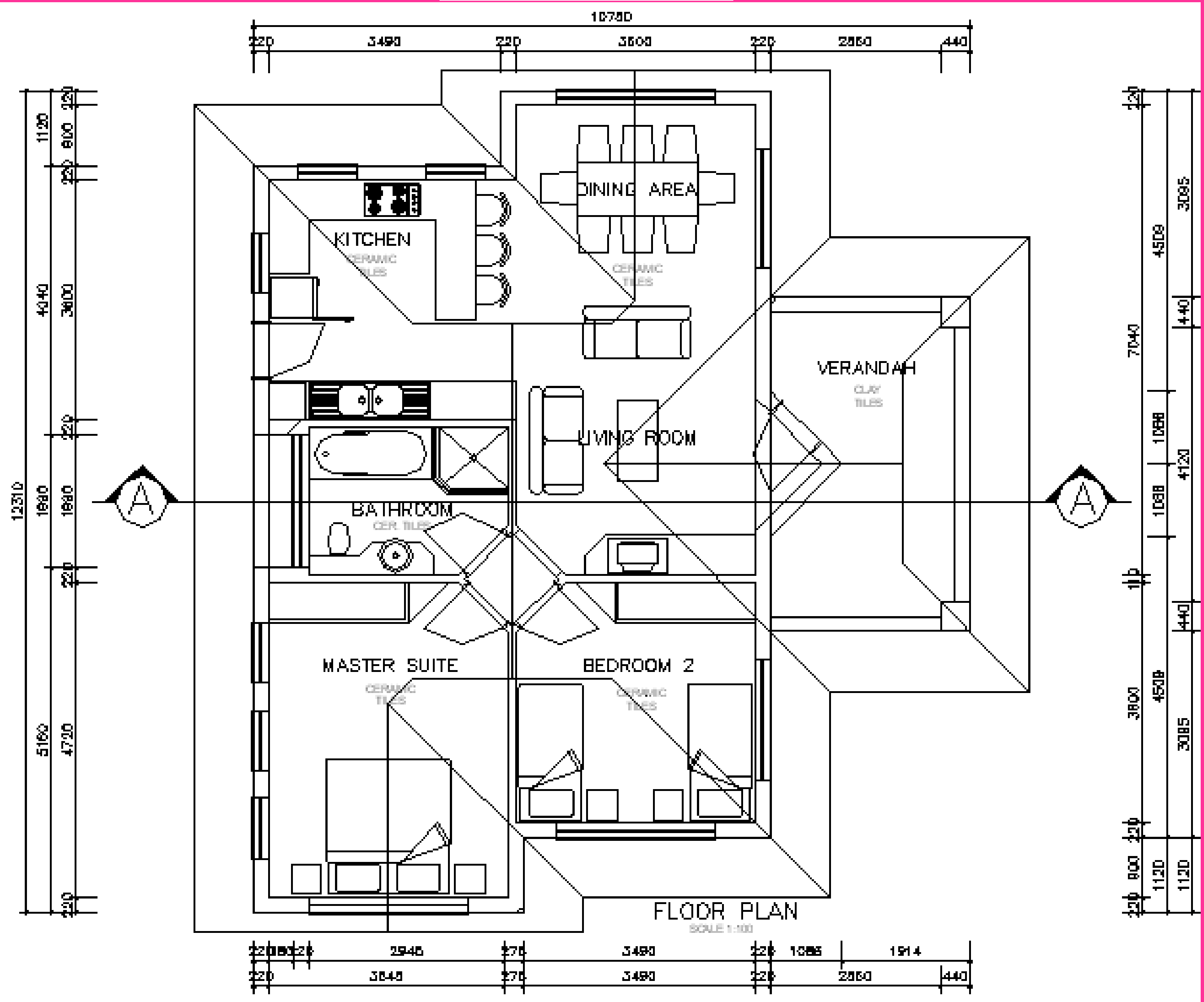

A section showing parts of a house.

# SITE PLAN



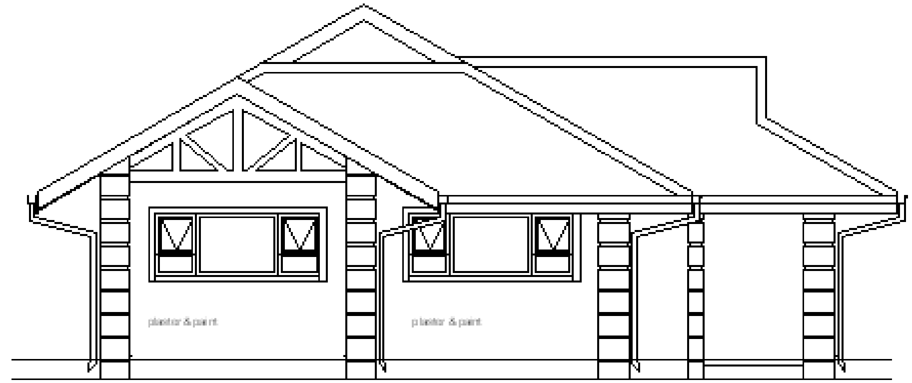

1. Cadastral Description (plot number)
2. North Point
3. Boundary Dimensions
4. Street names
5. Corner Beacon levels
6. Contour Levels
7. Setting out dimensions
8. Proposed buildings
9. Proposed Sewerage system
10. Driveway
11. Scale & Site plan title
12. Water connections

# FLOORPLAN

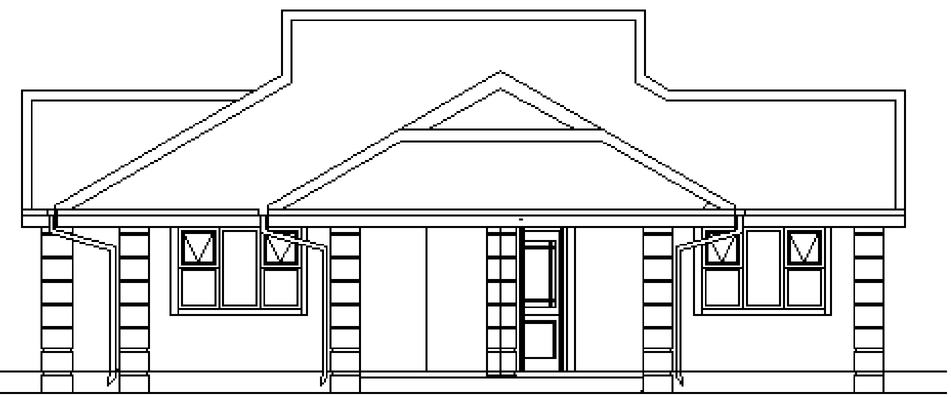

10750
220
3490
3600
2860
440
DINING AREA
CERAMIC TILES
KITCHEN
CERAMIC TILES
VERANDAH
CLAY TILES
LIVING ROOM
BATHROOM
CER. TILES
MASTER SUITE
CERAMIC TILES
BEDROOM 2
CERAMIC TILES
A
A
12310
1120
900
4040
3600
1680
5160
4720
4509
3095
7040
4120
3600
3085
2945
270
1914
3645
FLOOR PLAN
SCALE 1:100

# ELEVATIONS

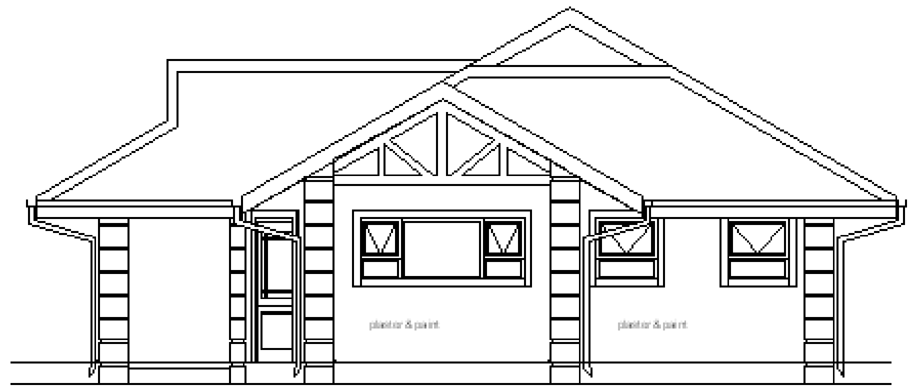

SOUTH ELEVATION
SCALE 1: 100




EAST ELEVATION
SCALE 1: 100



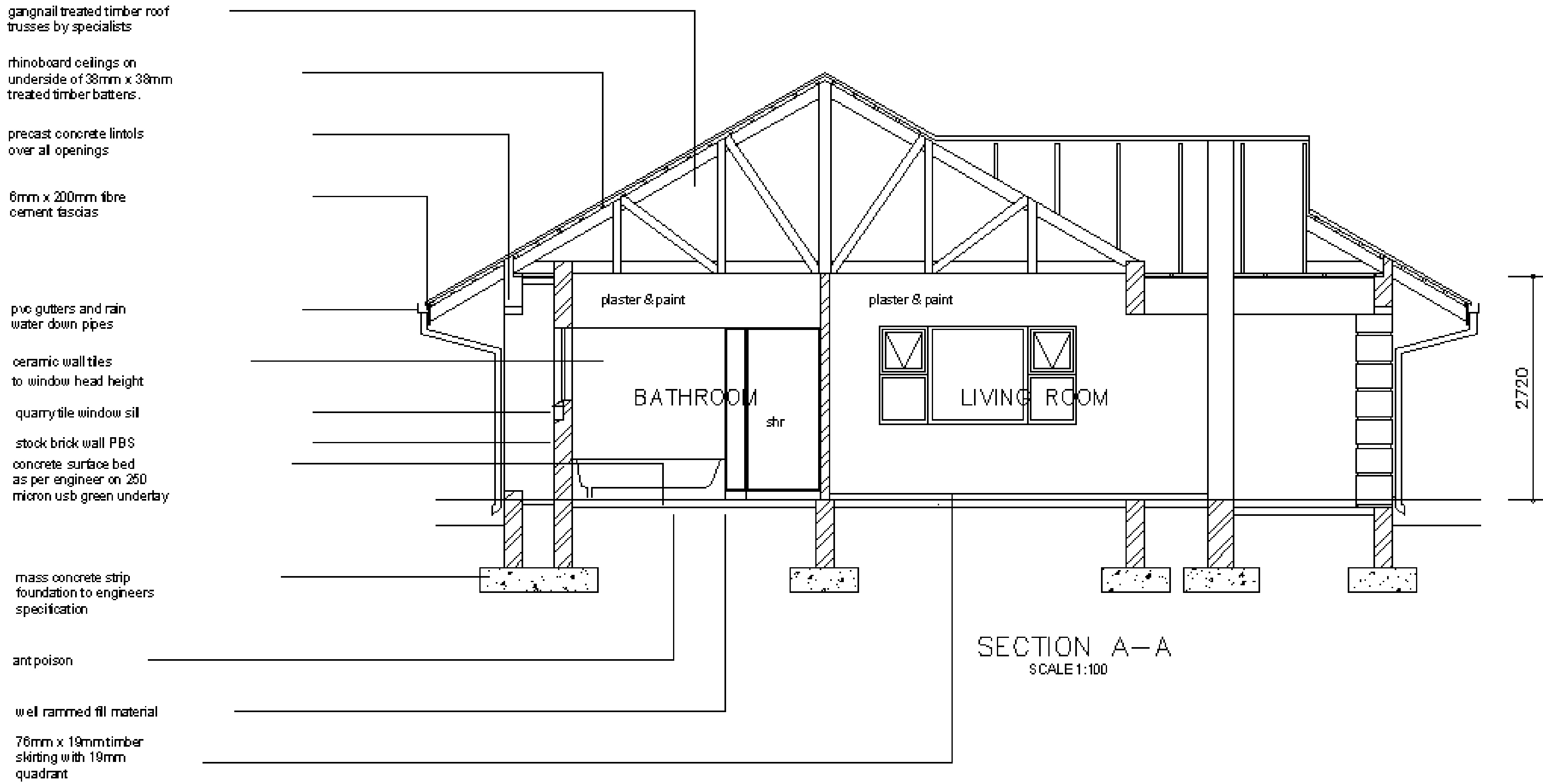
NORTH ELEVATION
SCALE 1: 100




WEST ELEVATION
SCALE 1: 100

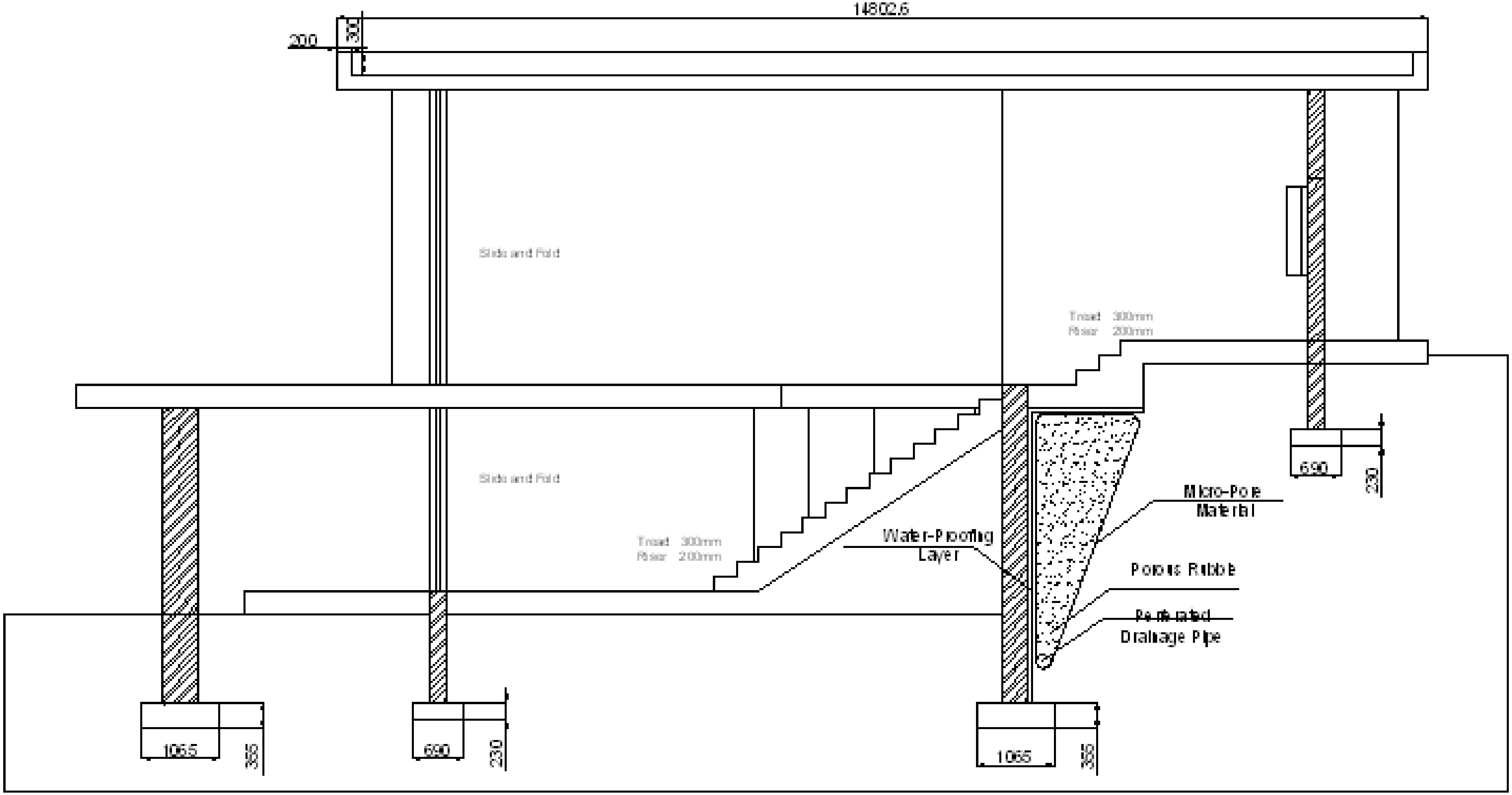
1. All relevant elevations provided (North, South, East, West)
2. Finishes to elevations provided.
3. Opening of windows shown.
4. External drainage pipes shown.
5. Boundary
6. NGL

# SECTION ELEVATION




1. Foundations shown
2. Dimensions
3. Ceiling Heights
4. Roof Construction
5. Drainage
6. Boundary
7. NGL

# SECTIONED ELEVATIONS

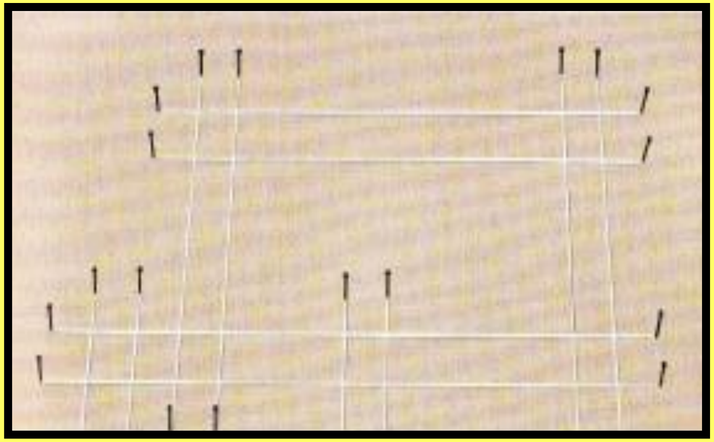


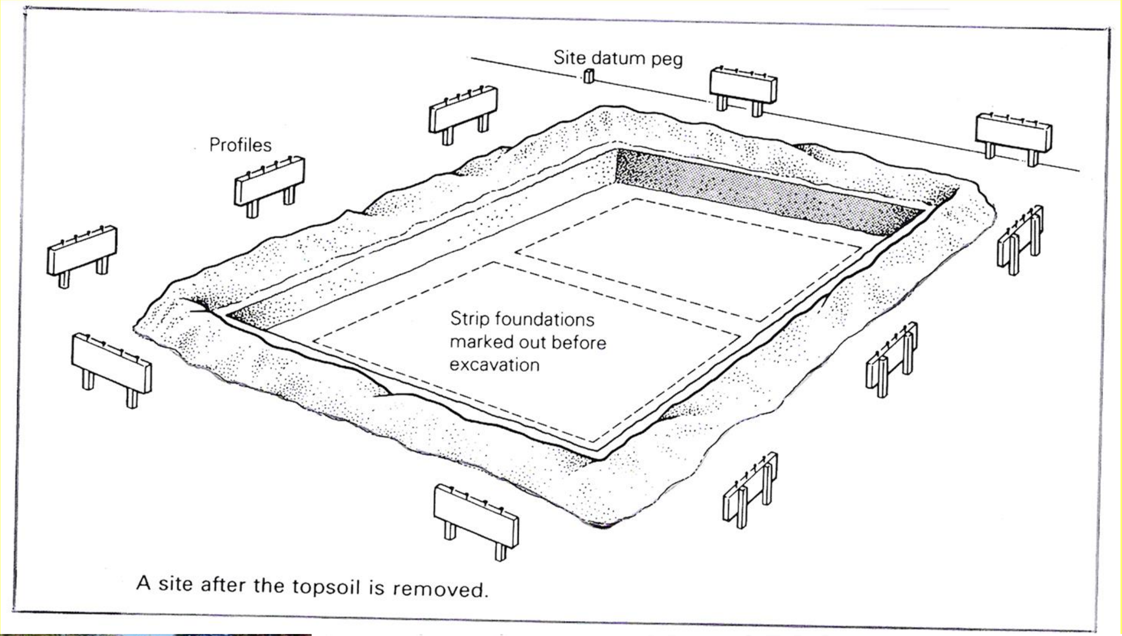
# COMMENCEMENT OF BUILDING

# Clearing of the building site

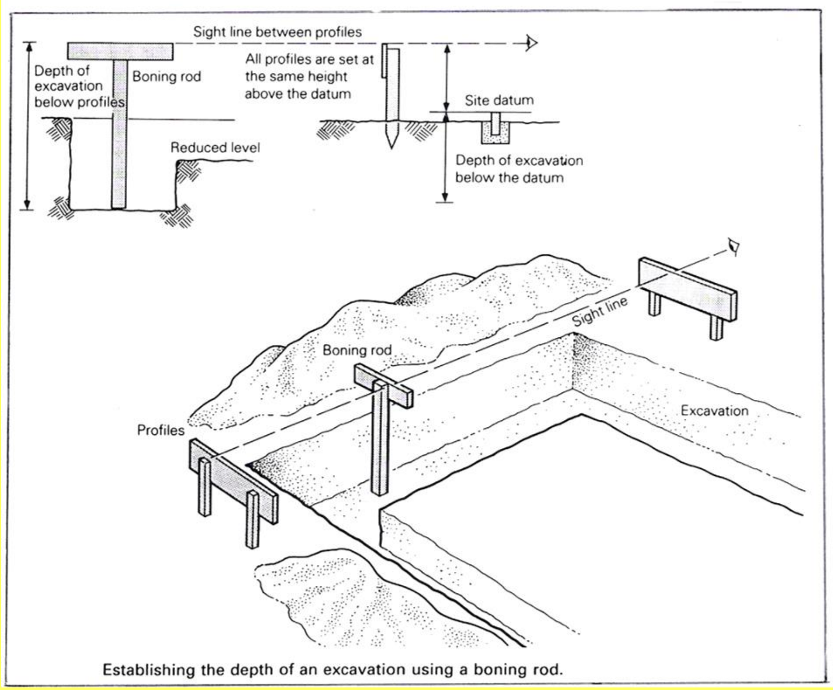
# PREPARATION OF A BUILDING SITE

1. Setting out.





A site after the topsoil is removed.



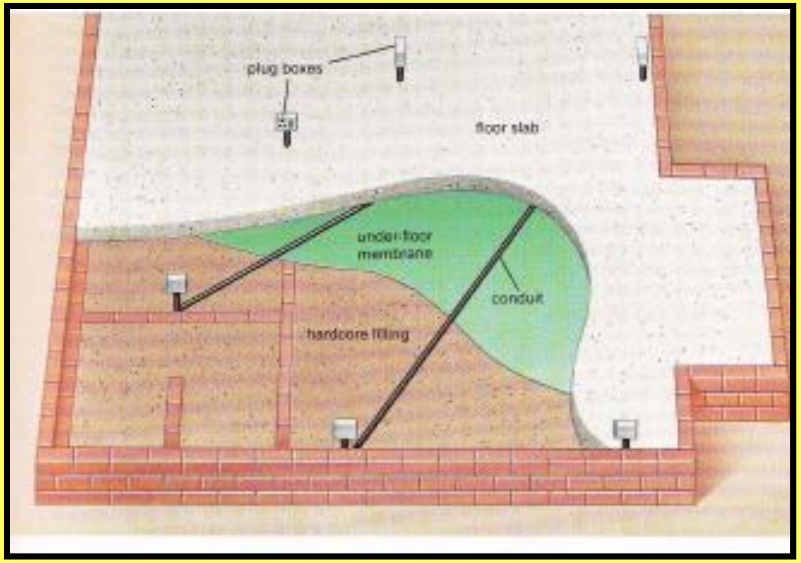
Establishing the depth of an excavation using a boning rod.

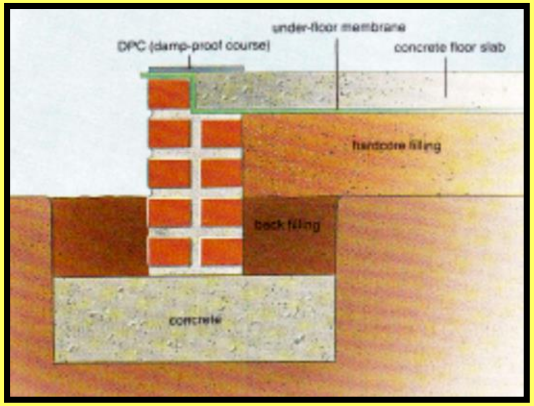
2. Dig out the Foundation holes

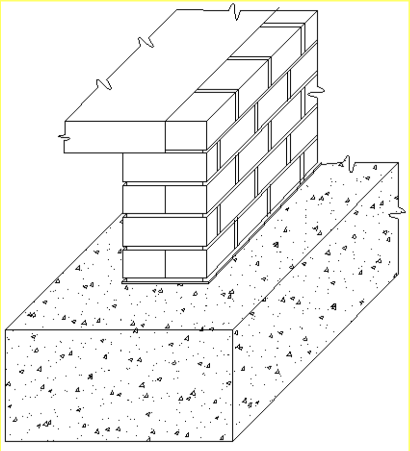
# EXCAVATIONS OF TRENCHES FOR FOUNDATIONS

# FOUNDATIONS

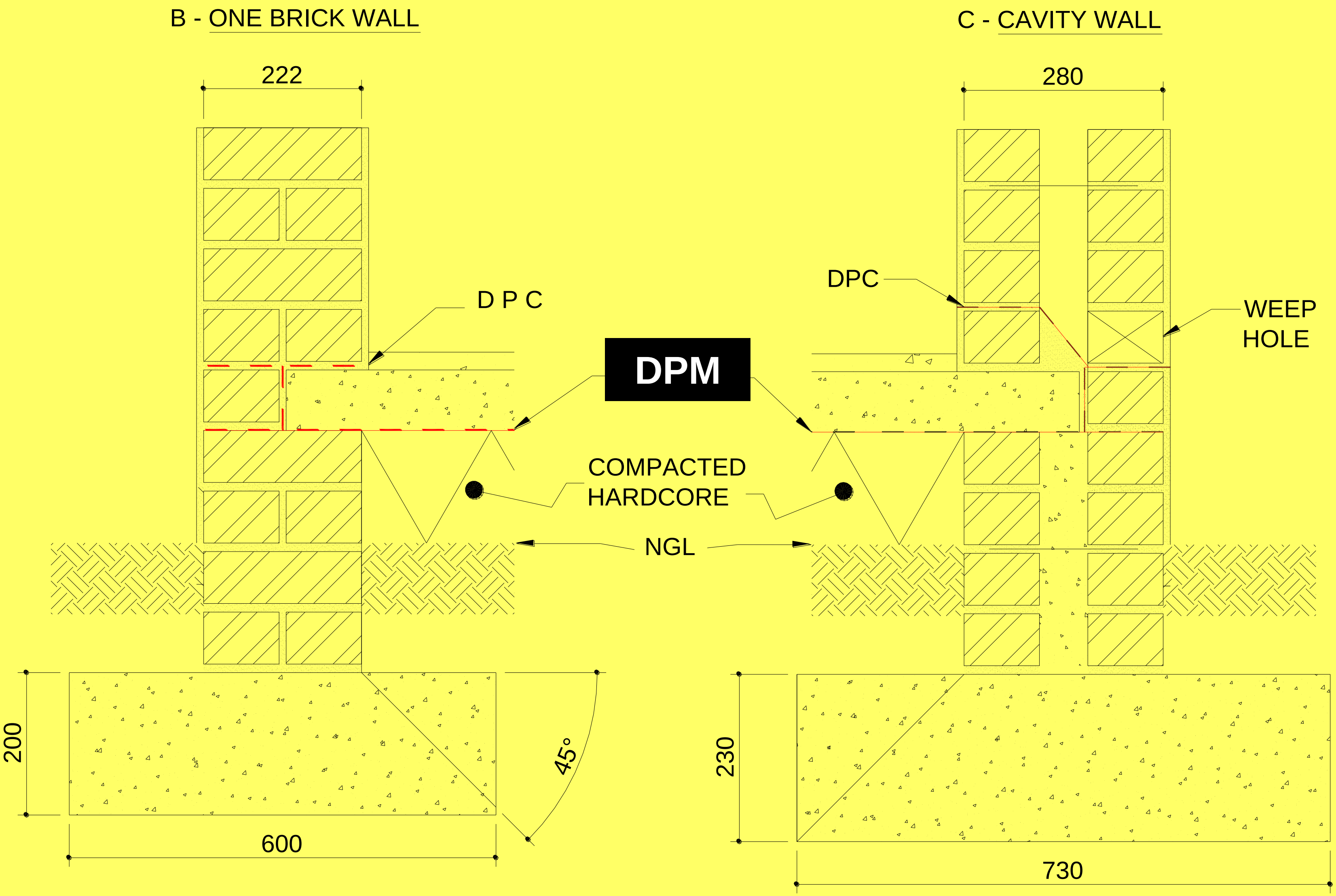
- Foundations are an integral part of the building which carries the structural load into the ground
- Foundations are made from concrete.

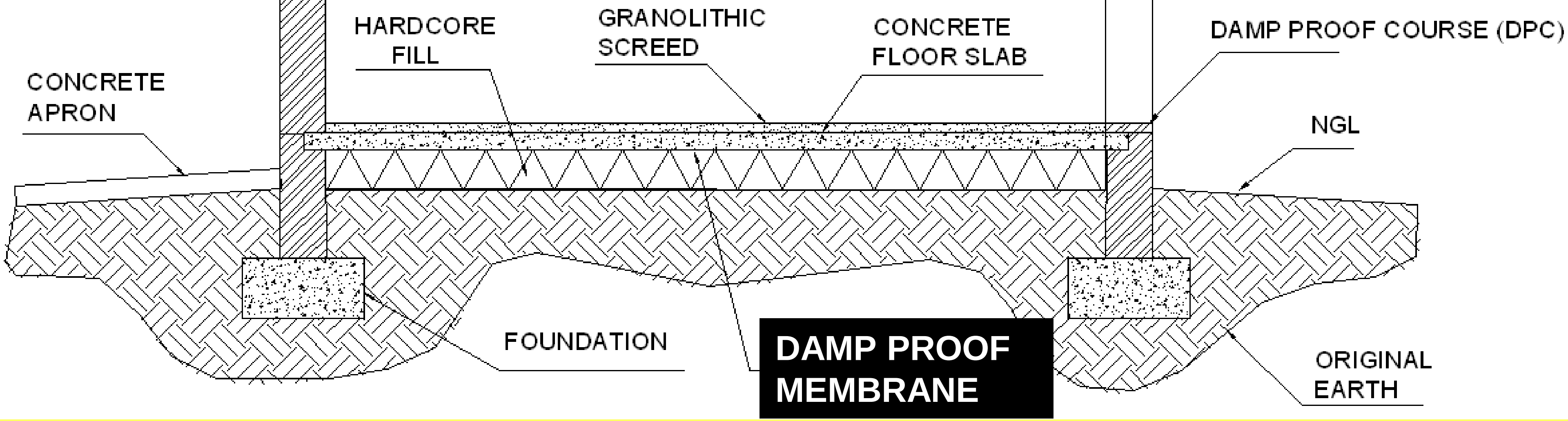


# FOUNDATIONS






**Depth below ground level:**

It is obviously undesirable for footings to be placed on the surface of the ground since, apart from appearance considerations, there is a risk of erosion of the soil by rainwater. Also, the surface soil is generally disturbed as a result of site clearing operations and will have a lower bearing capacity than that below. Trenches should therefore be taken down to undisturbed soil and in any event at least 300 mm below ground level. The bottom of a foundation must normally be at least 400 mm under ground level. Trenches are first dug to the required dimensions and any soft spots dug out and filled with lean concrete. It is important that no structure should be built on loose soil or filled-up ground. The bottom of the trenches and the top surfaces of foundation must always be horizontal.

**Hard core filling:**

Generally, a layer of 100 to 150 mm thick of selected material such as gravel or sand, carefully compacted, should be provided immediately below the concrete. Under domestic and other lightly-loaded floors, selected building rubble, and even ash from power stations or large industrial plants, may be used for this purpose.

**Damp proofing:**

Before laying the concrete the whole surface of the foundation should be covered with a damp proof course, the most suitable material available for this purpose, being polyethylene *(plastic)* sheeting not less than 0,25 mm thick. The sheeting should be turned up against the walls and later cut off flush with the top surface of the concrete. Joints between strips can be made simply by overlapping them by about 200 mm. On wet sites more elaborate precautions are needed.

# WATERPROOFING

## Materials that can be used for damp-proof courses:

1. **Polyethylene *(Polythene)* sheet *(PE*)** Polyethylene sheet for waterproofing of structures.

2. **Polyethylene vinyl acetate copolymer sheeting *(PVC)*** is particularly puncture resistant.

3. **Bitumen:** Bitumen manufactured in rolls of convenient widths, is commonly used today. Various bases are available, such as hessian, asbestos and felt, all of which are inexpensive but have the main disadvantage of being torn easily.

4. **Asphalt:** Mastic asphalt is applied in two layers giving a total thickness of 25 mm. It is applied in situ and therefore joint less and very suitable but rather expensive.

5. **Lead:** Lead is a very suitable material for D.P.C. It is flexible and large surfaces can be covered.

6. **Copper:** Copper should have a minimum thickness of 0,25 mm. As with lead, it is supplied in thin sheets and is very expensive. It is seldom used in modern construction.


# WATERPROOFING

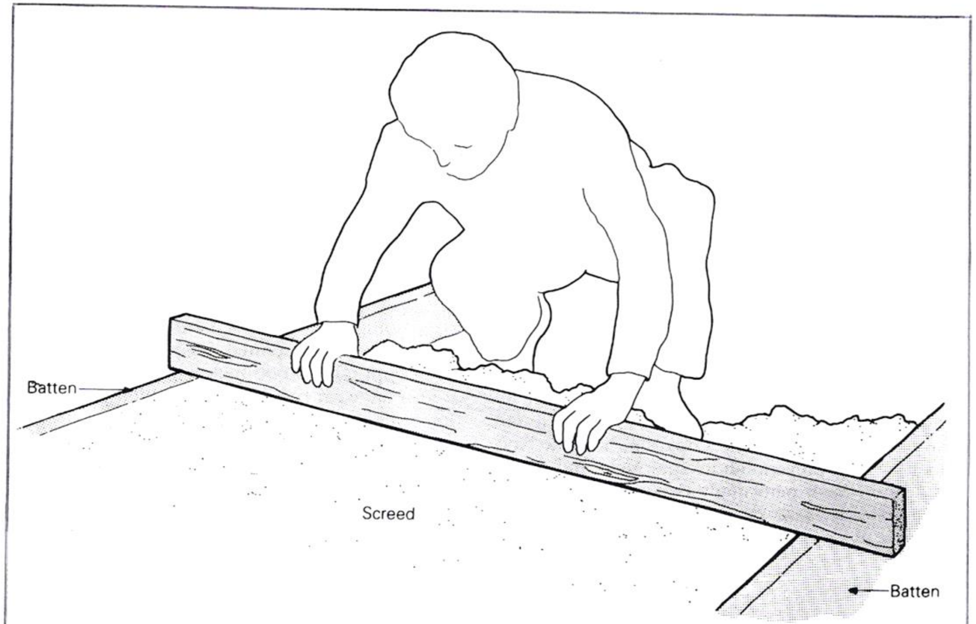

The purpose of a damp-proof course in a building is to provide a barrier to the passage of moisture from an external source into the fabric of the building or from one part of the structure to another.

**Placing damp-proof courses:**
Damp-proof courses may be placed horizontally, vertically:
1. below ground level to prevent the entry of moisture from the soil;
2. above ground level to prevent rising damp, i.e. moisture moving up the wall;
3. at windows and parapets to exclude the entry of rainwater.
4. Doors
5. Roof

**Properties damp-proof courses:**
1. Completely waterproof;
2. Should be durable with a longer lifespan than the other components in the building and therefore should not need replacing during its lifetime.
3. Must come in comparatively thin sheets so as to prevent disfigurement of the building.
4. Be strong enough to support the loads placed upon it without allowing moisture to penetrate.
5. Be flexible enough to give way with any settlement of the building without fracturing.

# CONCRETE SLABS

Concrete floors are expected to last for many years, during which time they are subjected to heavy loads and hard wear.
It is therefore sound economy to build in high quality at the outset and avoid future trouble and costly maintenance.
Once a floor has begun to fail, little can be done in the way of repair.



Levelling a screed between screed battens in bays.

# **CONCRETE SLABS**

# SUPER-STRUCTURE

Is that part of the building from the floor slab to the ceiling / wall plate level.

1. Door frames are placed in position.
2. Brickwork is built up to door and window height.
3. Lintel above all openings – doors, windows etc.
4. Wall anchors/roof ties are placed into brickwork.
5. Brickwork continues to roof height.

# LINTELS

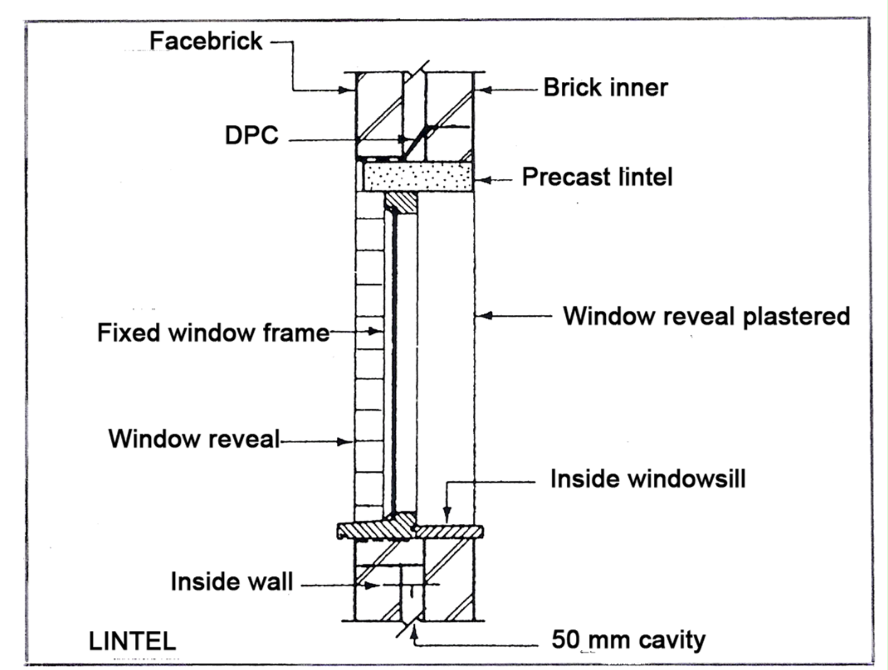
A lintel is a beam, which is formed by combining a pre-cast reinforced or pre-stressed concrete ‘plank’ of relative shallow depth with the brickwork.

Lintels are placed above doors and windows.

# LINTELS

## PRE-CAST LINTEL

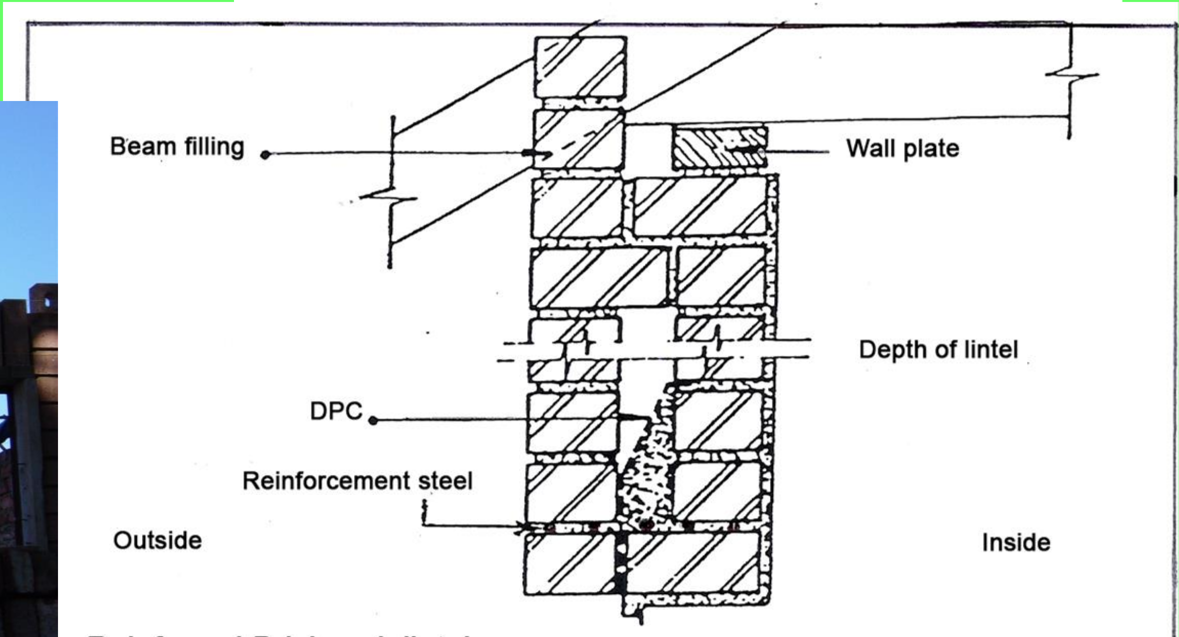
With this method a beam is formed by combining a pre-cast reinforced or pre-stressed concrete ‘plank’ of relative shallow depth with the brickwork.




## REINFORCED BRICK LINTEL

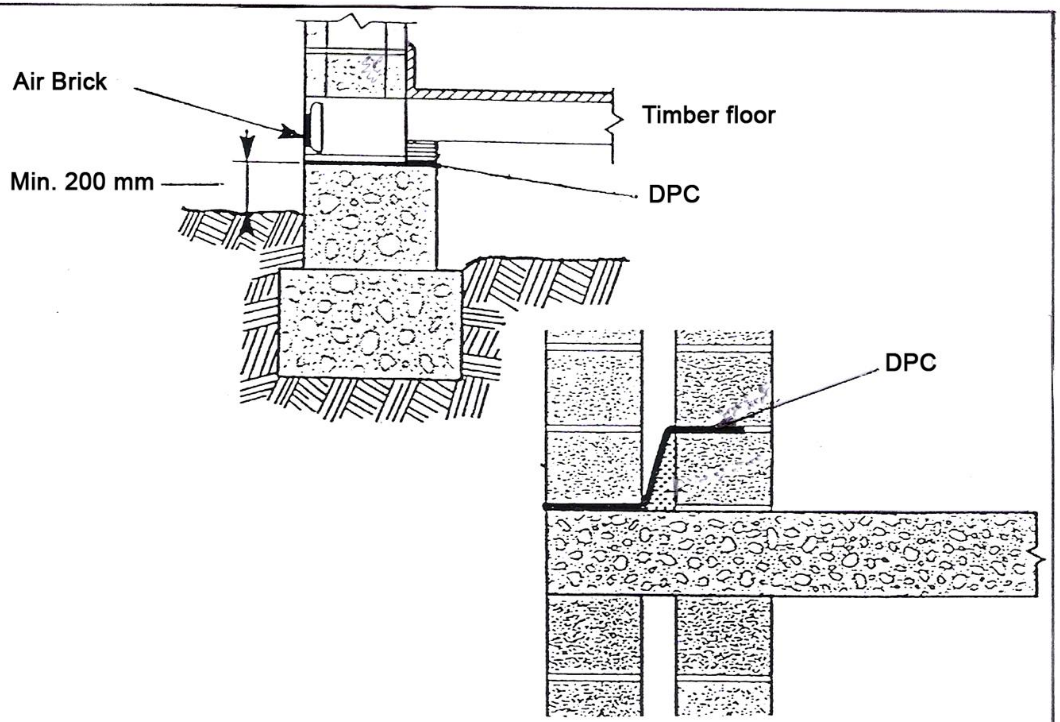
Advantages:

1. The appearance is uniform in face-brick walls.
2. Differential shrinkage cracking is avoided.
3. Apart from the bricks, reinforcing steel is the only other material needed.

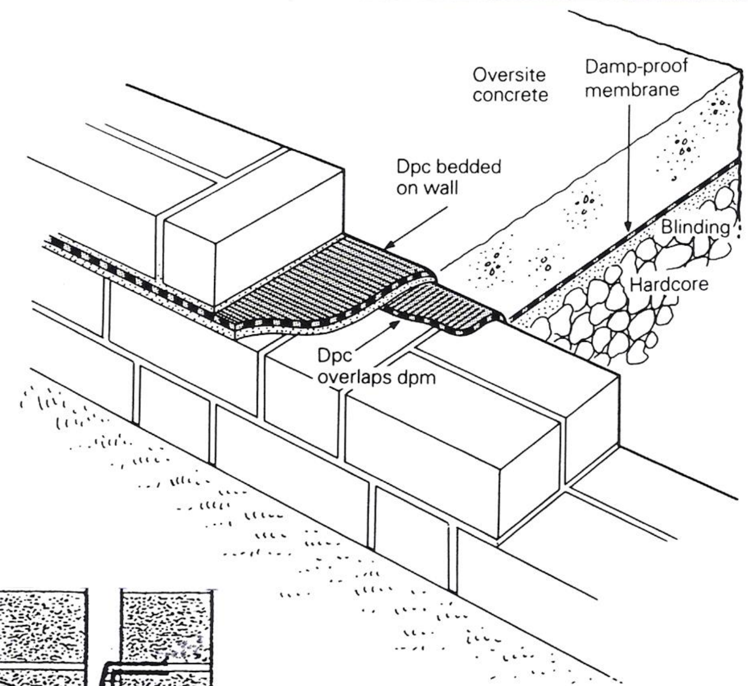



Reinforced Brickwork lintel

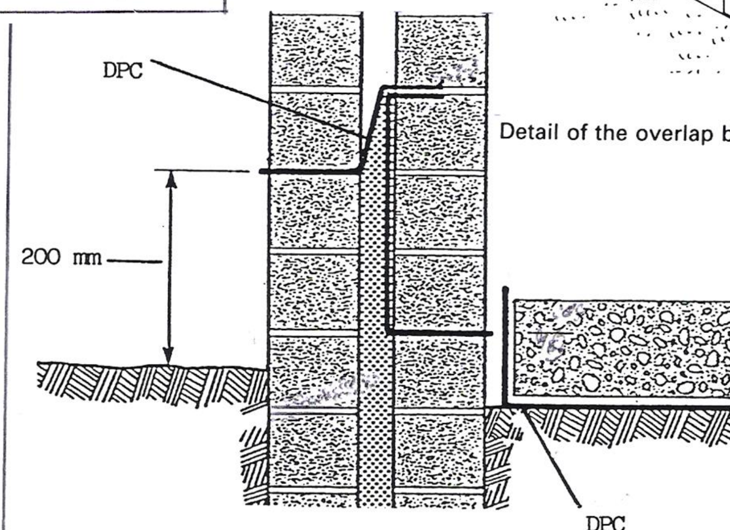
# DPC



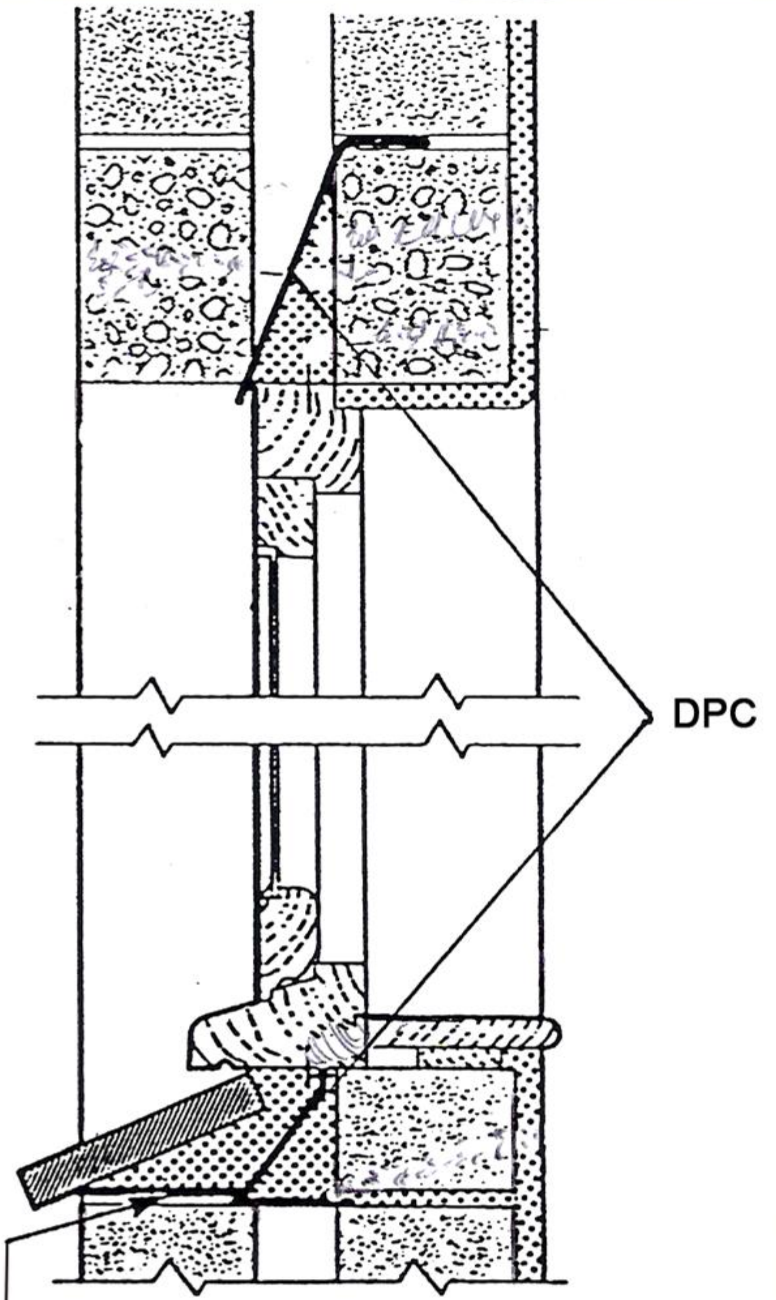
Cavity wall on concrete slab



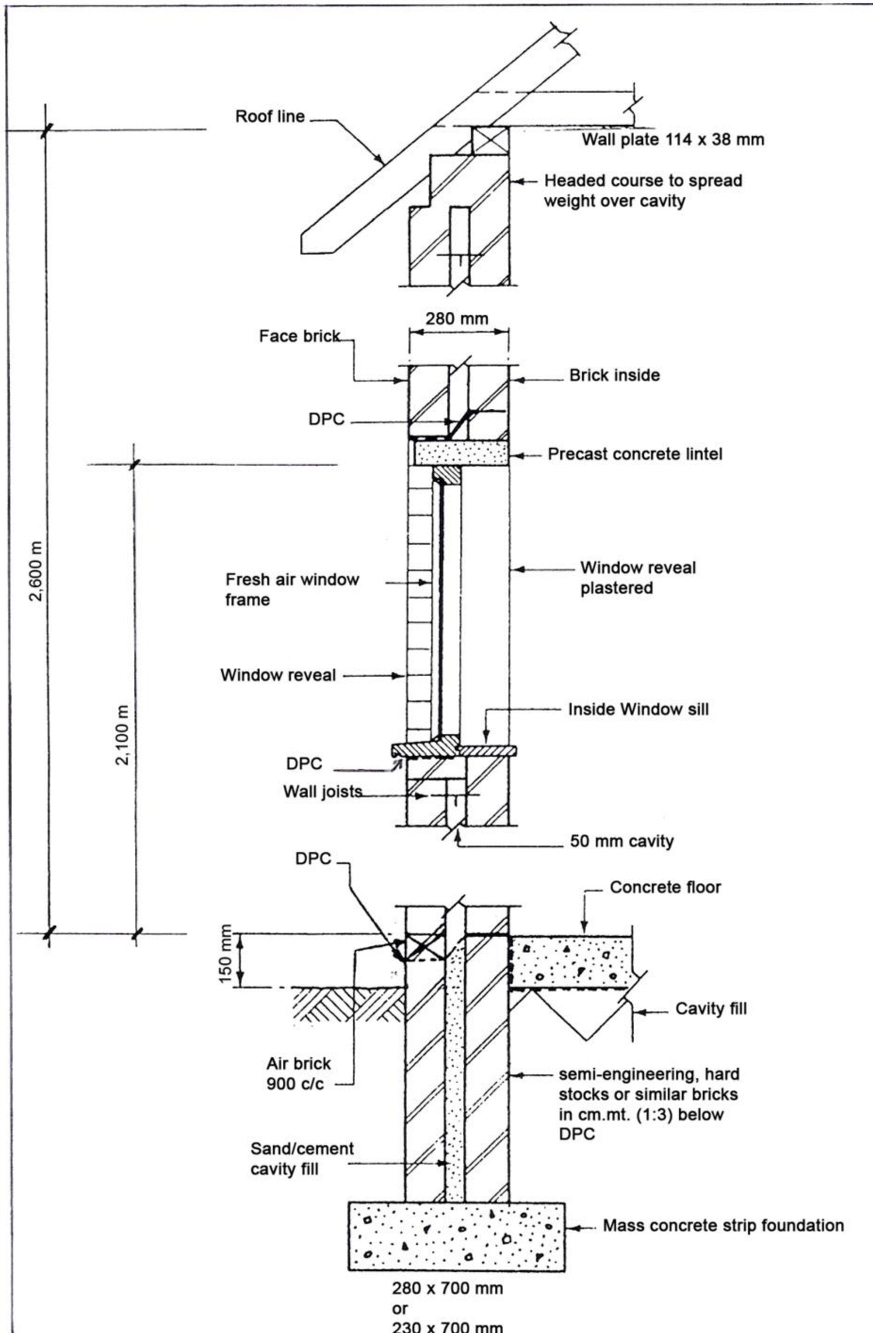
Detail of the overlap between a dpc and a dpm.



Cavity wall with floor level with ground

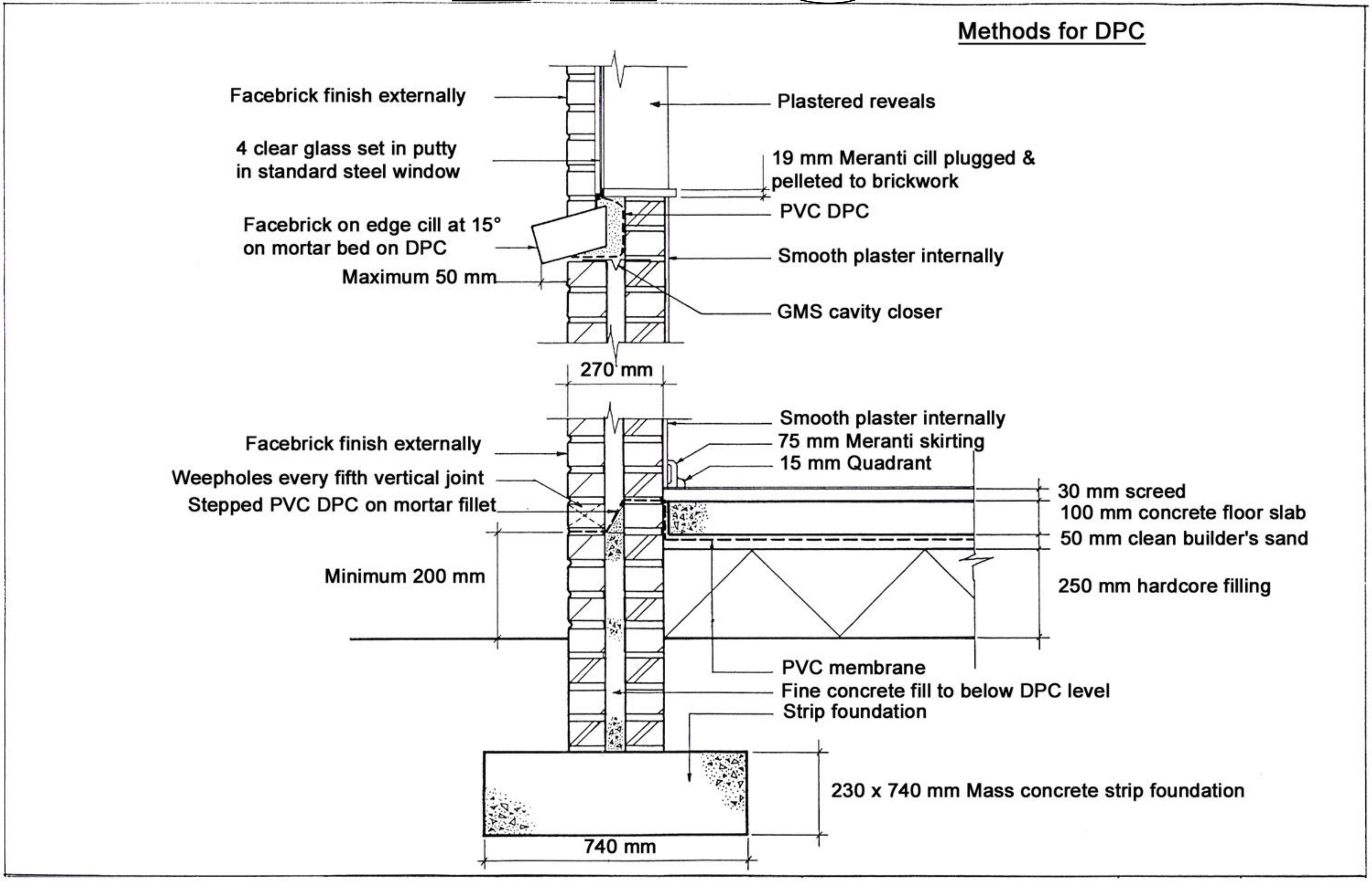



Window frame in cavity wall

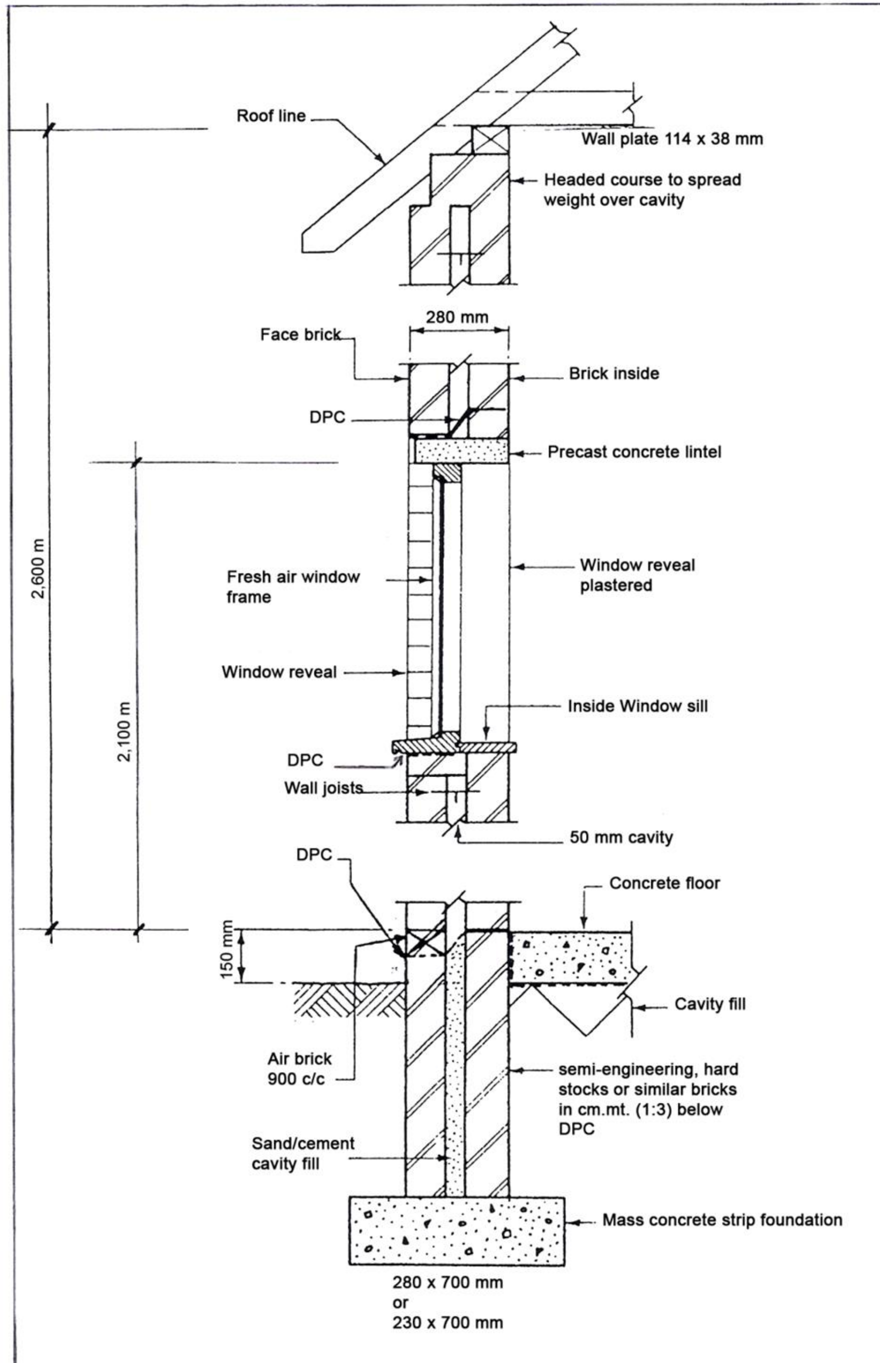



Section through outside wall

# DPC



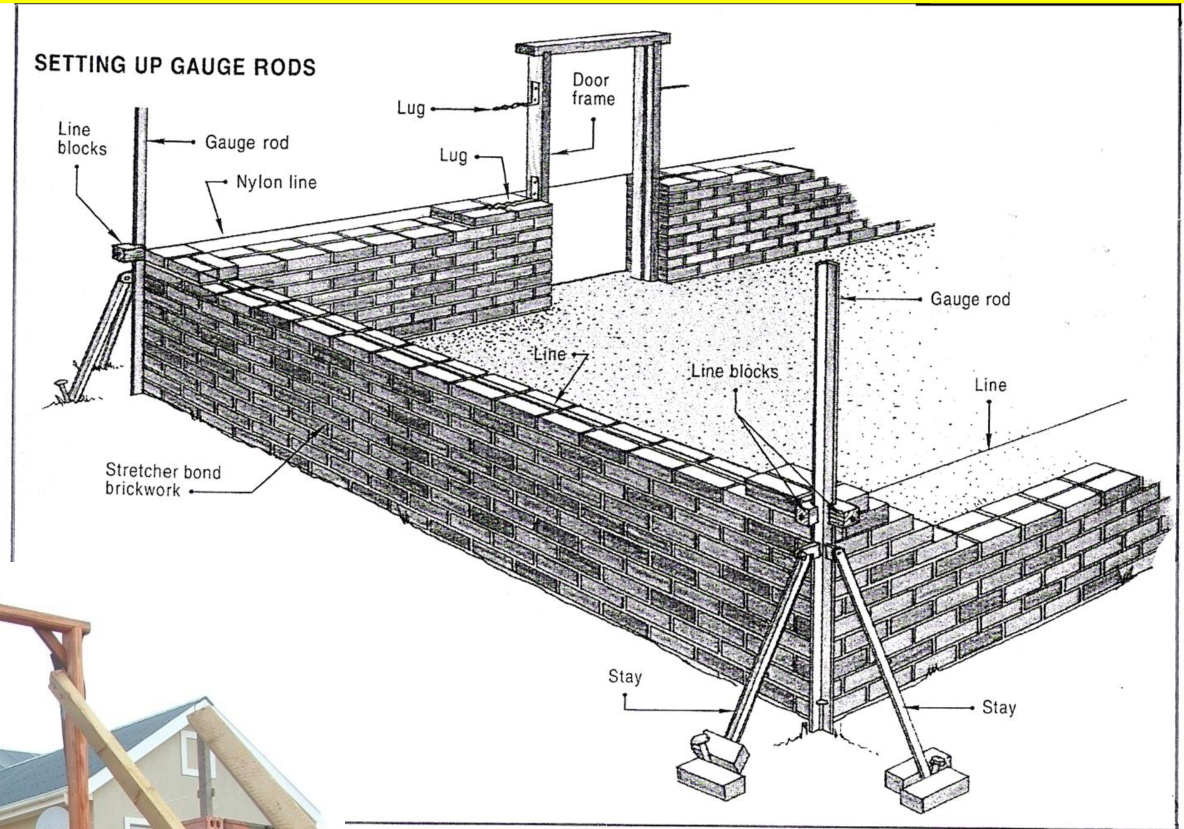
Methods for DPC
Facebrick finish externally
4 clear glass set in putty
in standard steel window
Facebrick on edge cill at 15°
on mortar bed on DPC
Maximum 50 mm
Plastered reveals
19 mm Meranti cill plugged &
pelleted to brickwork
PVC DPC
Smooth plaster internally
GMS cavity closer
270 mm
Facebrick finish externally
Weepholes every fifth vertical joint
Stepped PVC DPC on mortar fillet
Minimum 200 mm
Smooth plaster internally
75 mm Meranti skirting
15 mm Quadrant
30 mm screed
100 mm concrete floor slab
50 mm clean builder's sand
250 mm hardcore filling
PVC membrane
Fine concrete fill to below DPC level
Strip foundation
230 x 740 mm Mass concrete strip foundation
740 mm



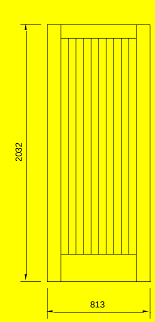

Section through outside wall

# DOORS

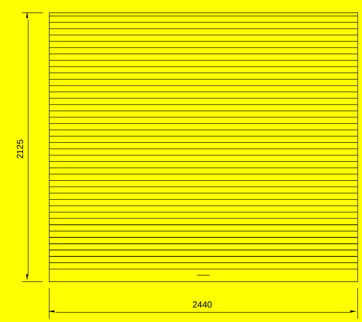
Door and window frames are normally built in as the work proceeds. If the built-in method is used, hoop iron pieces *(ties)* are fixed to the sides of the frames in line with the horizontal brick joints. These ties are then built in as the brickwork proceeds. In addition to the ties, door frames are anchored to the floor by means of steel pins at the bottom ends of frame styles. The steel pins are imbedded in the concrete floor.



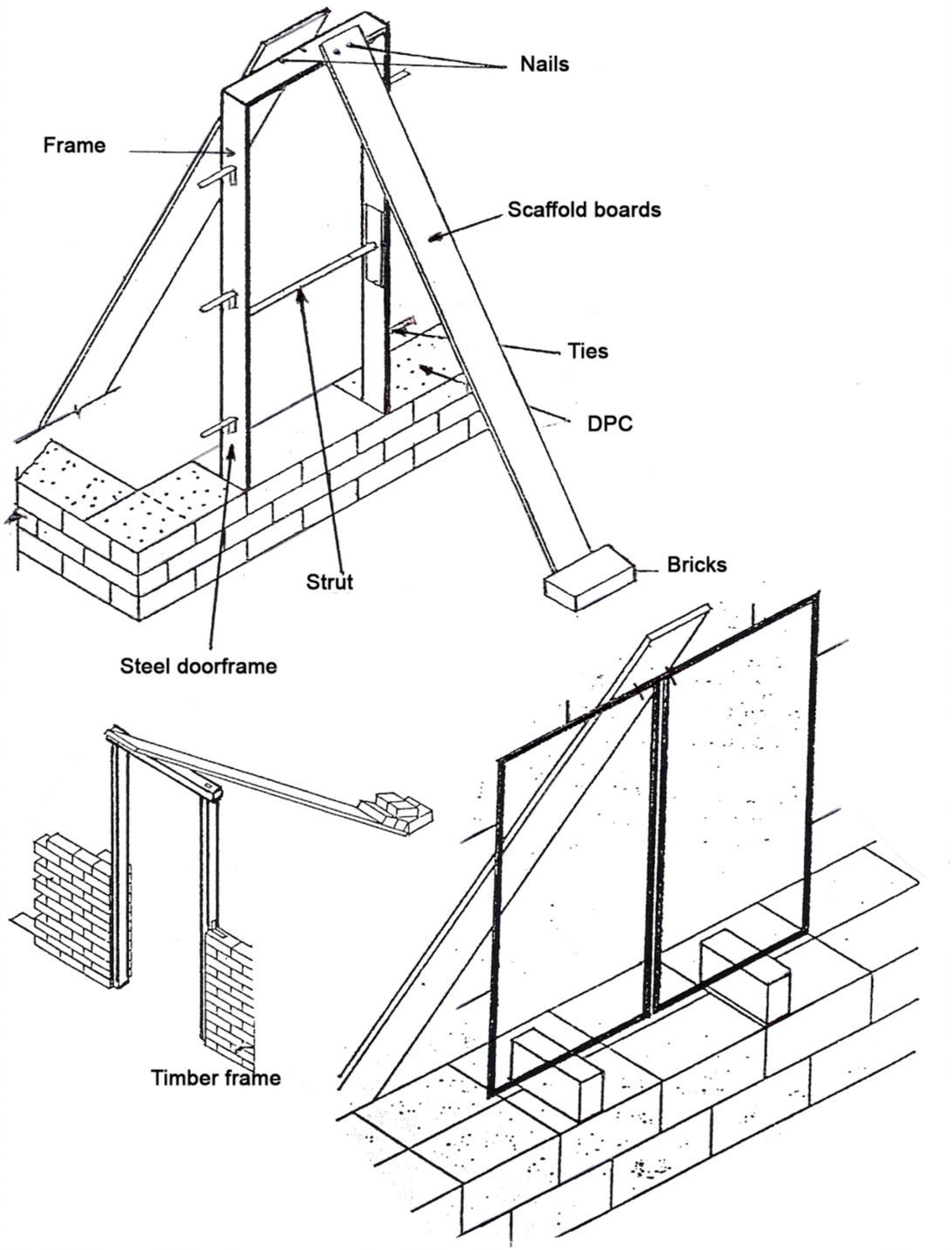

**STANDARD WOODEN DOOR**




**STANDARD GARAGE DOOR**

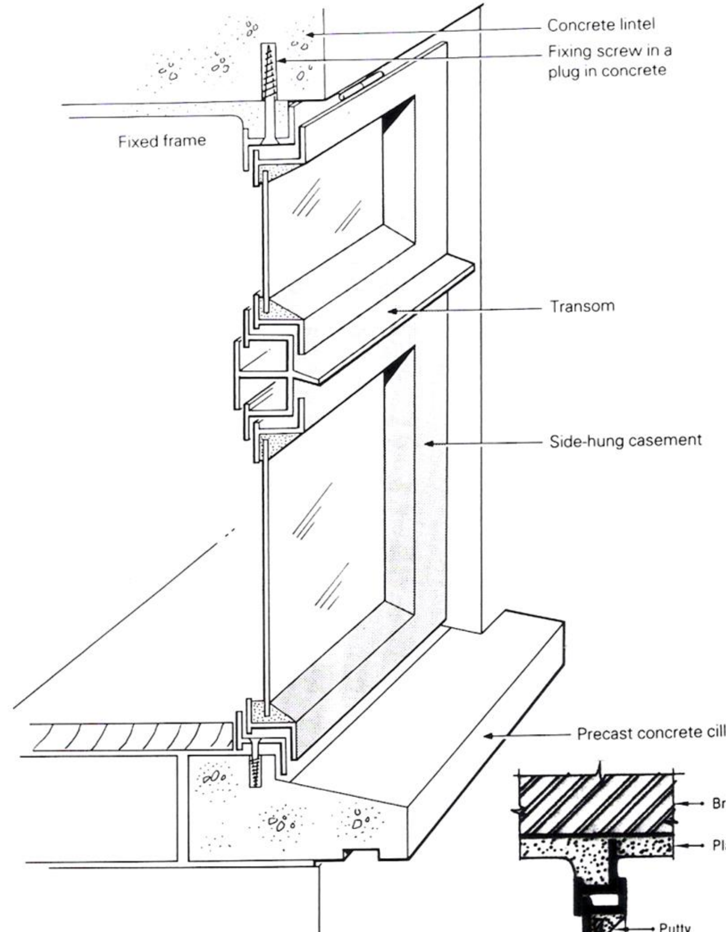


# Mounting and fixing of frames

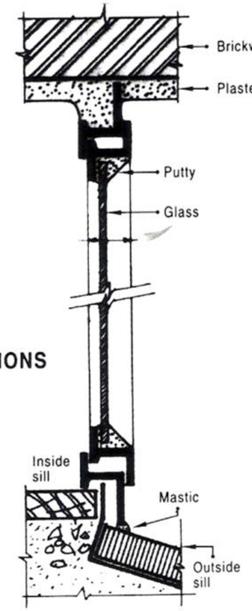



# WINDOWS

- A window is a frame, built into a wall, which can be opened or closed in order to let in light and air.
- Windows let light in through the glass, but to provide ventilation they have to be opened.
- Thus a window consists essentially of a frame into which a smaller frame fits, known as a casement.



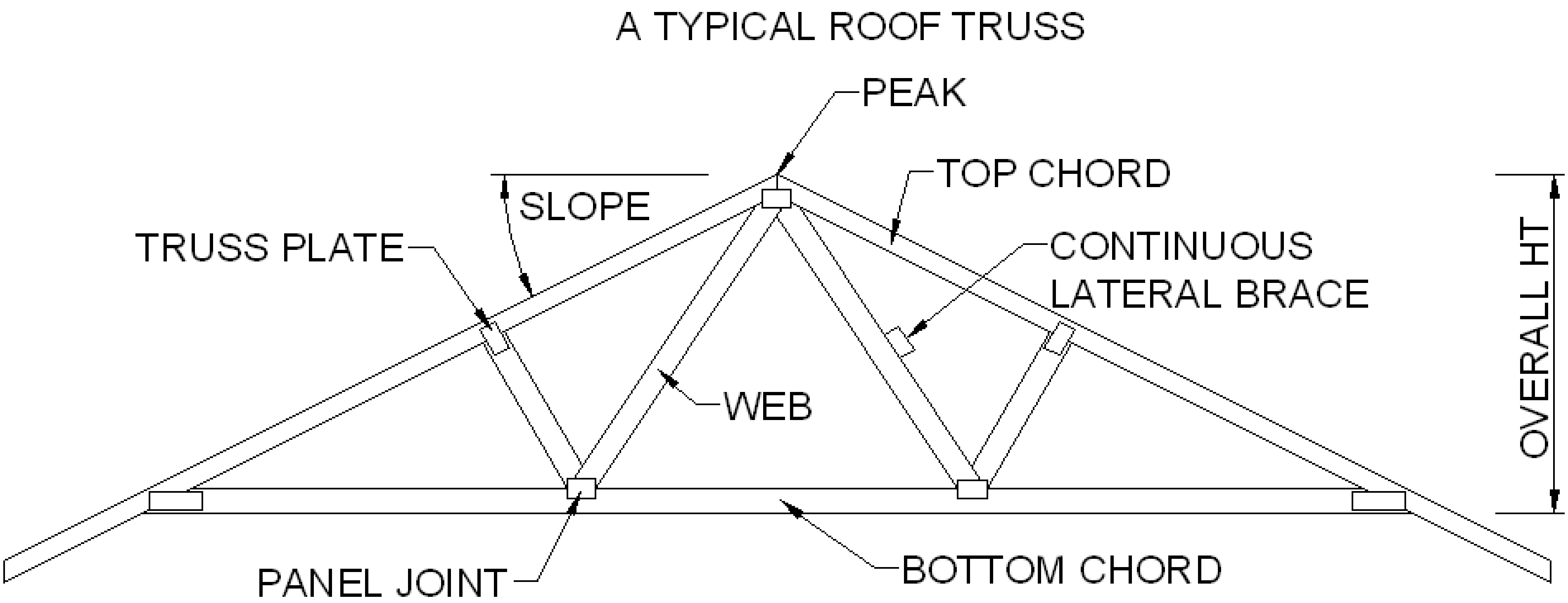

**Fixing windows to openings**

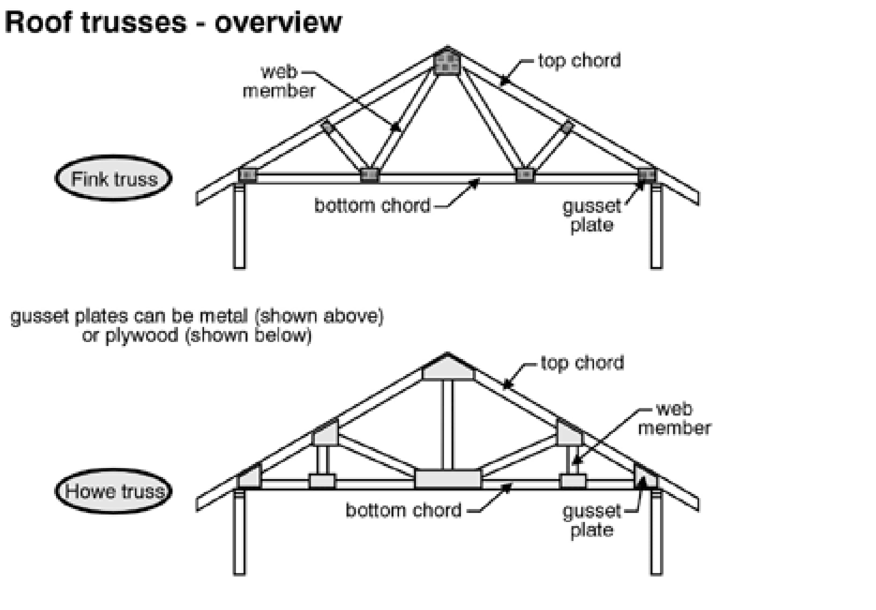



RESIDENTIAL WINDOW SECTIONS

1. Wall plates are placed and nailed into position.
2. Roof trusses are placed in position and nailed to the wall plates.
3. Roof trusses are then tied and secured to the wall plates.
4. Damp  proofing is placed over the the trusses.
5. Battens/Purlins are then nailed into position.
6. Roof  covering is then placed on battens or purlins .
7. Ridge covers are placed in position with mortar.
8. Barge  and fascia boards are secured in position.
9. Rainwater goods are then placed and secured into position.

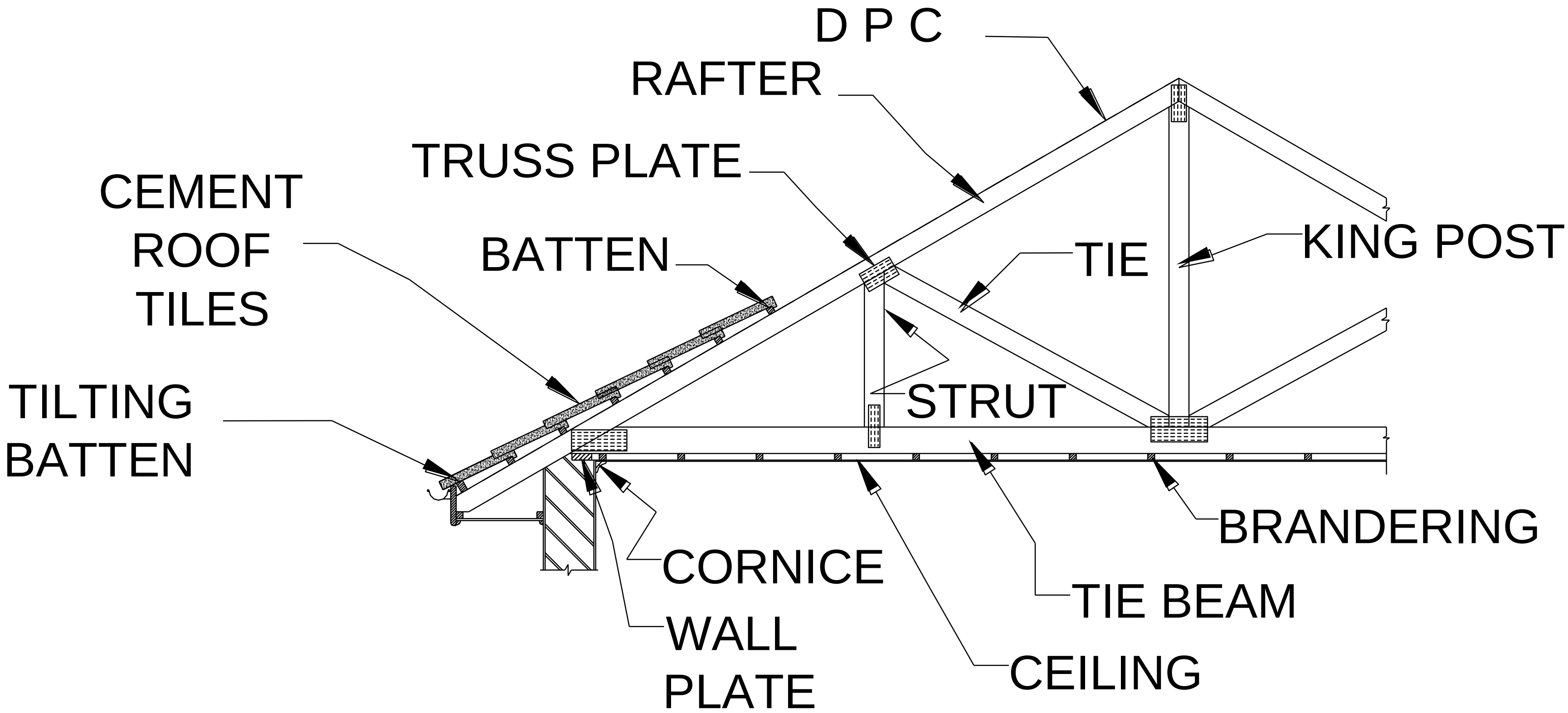
# ROOF TRUSSES




Roof trusses are structural assemblies that support and hold up roofs and ceilings. It is the frame of the roof. Roof trusses are strong due to the triangular geometrical shape. A series of triangular shapes are fastened together using truss plates or gussets. The outside members are called chords/rafters/beams while the inside members are called webs/ties/beams.

# ROOF TRUSSES




**DPC** - Damp Proof Course (Waterproofing for the roof)

**Rafter** – A beam for roof structure

**Truss Plate** – A metal plate that joins rafters & beams

**Batten** – A wooden beam used to nail roof tiles

**Cement Roof Tiles** – a type of roof covering

**King Post** – The main centre beam/rafter of a truss

**Tie** – a beam used for strengthening the truss

**Strut** – a strengthening beam/rafter

**Brandering** – wooden battens for nailing the ceiling

**Tie Beam** – a main beam which tie beams are joined to

**Ceiling** – the inside covering of the roof/truss

**Cornice** – the neatening of the wall and ceiling join

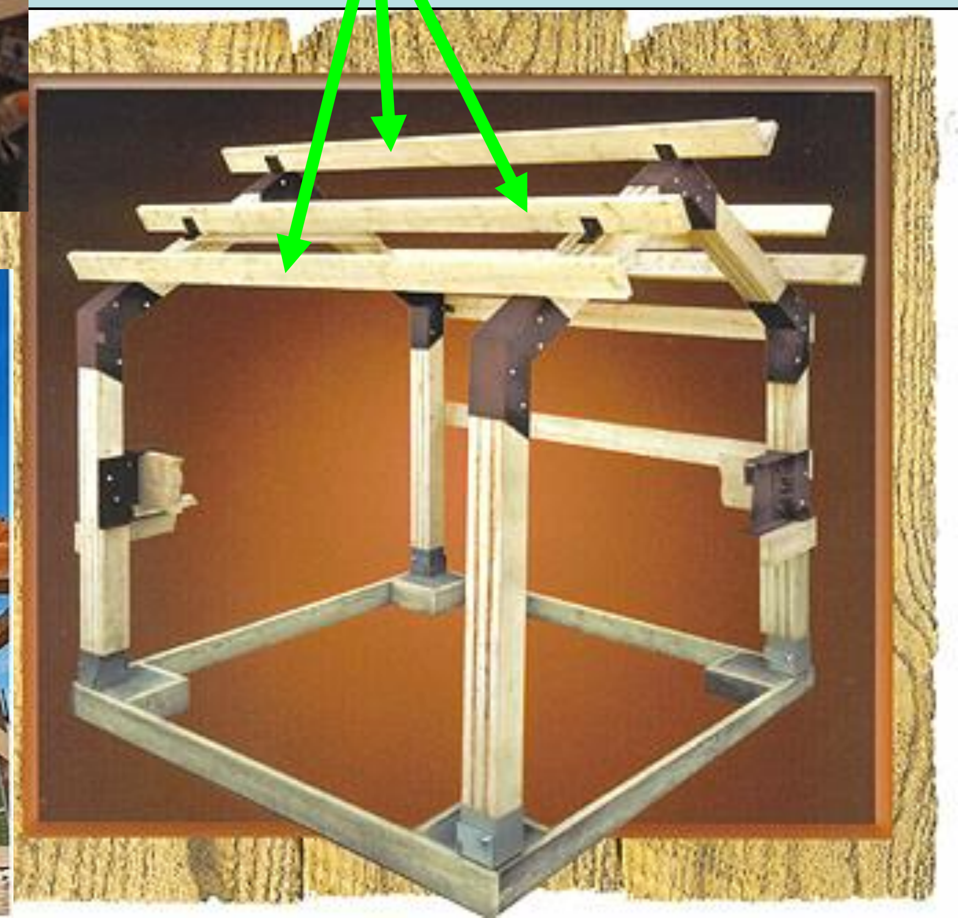
**Wall Plate** – a wooden beam used to level out the truss

# ROOF TRUSSES

Trusses are mass produced and wood is the common material.

Trusses can be customized according to the style of the house.

Roof tiles are nailed onto wooden battens. These battens are nailed to the trusses.

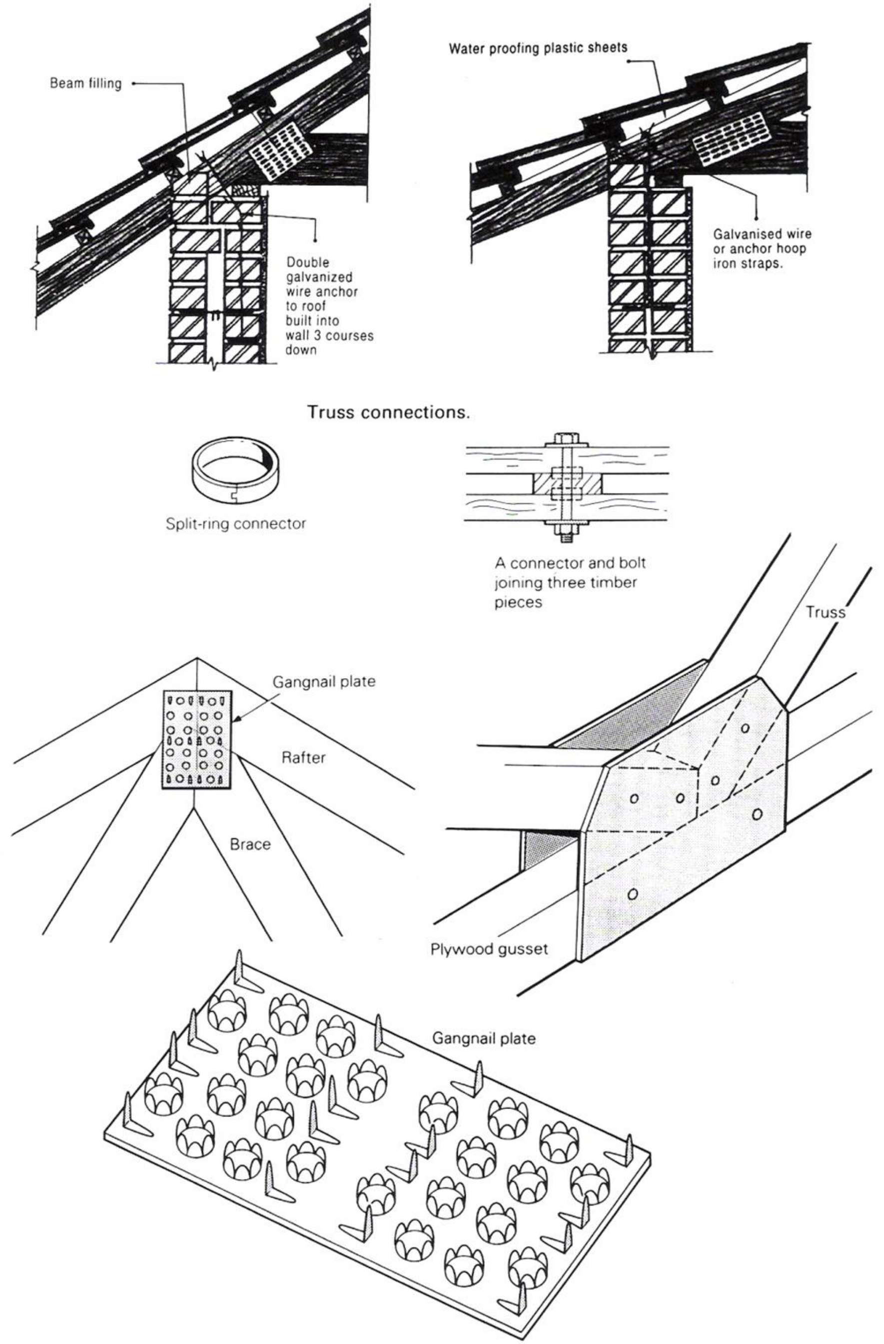


# ROOF

• The structure supporting the roof waterproofing and the waterproofing membrane must be capable of resisting the forces which are likely to be applied.

• The roof structure must be designed to carry its own weight, the waterproofing material and ceiling and any additional loads – such as water-tanks etc. *(dead loads)* and other loads such as workmen and to resist wind pressures.

• Truss constructions are often inadequate and excessive deflection and distortion of the roof structure may occur.



**ROOF BATTENS**

**GANGNAILS**

Gangnails are used to join rafters and beams together.

**WALL PLATE**

Wall Plates level out the trusses. Without wall plates, the trusses will all be uneven.

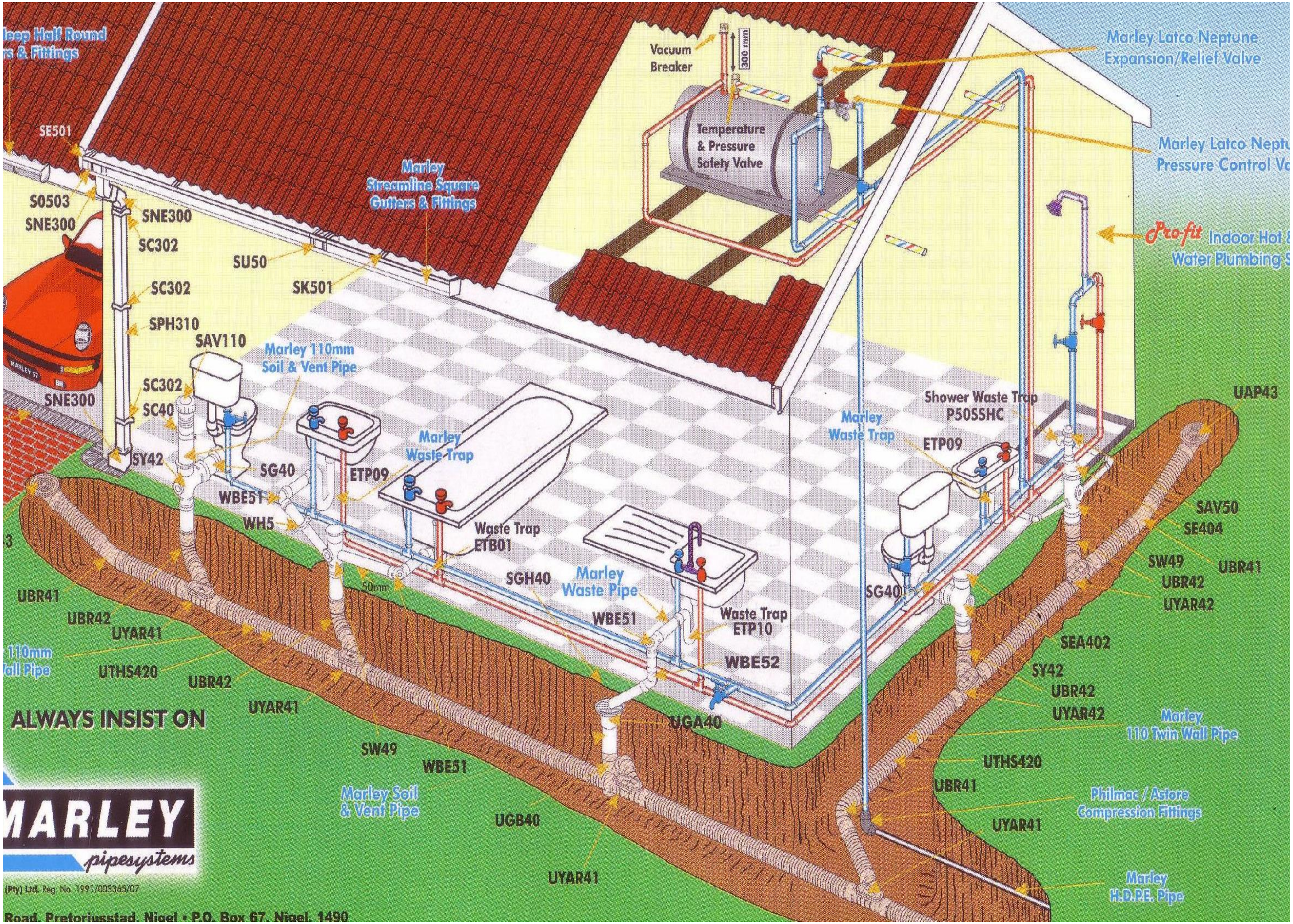
**WALL PLATE**

**BATTENS**

# Open and closed eaves

# PLUMBING


GUTTER
FACIA BOARD
BRICKED UP WALL NEAR TRUSS
TRUSS
DOWN PIPE



Vacuum Breaker
300 mm
Temperature & Pressure Safety Valve
Marley Latco Neptune Expansion/Relief Valve
Marley Latco Neptu
Pressure Control Va
Pro-fit Indoor Hot &
Water Plumbing S
Marley Streamline Square Gutters & Fittings
SE501
S0503
SNE300
SNE300
SC302
SU50
SC302
SK501
SPH310
SAV110
Marley 110mm Soil & Vent Pipe
SC302
SNE300
SC40
SY42
SG40
WBE51
ETP09
Marley Waste Trap
WH5
Waste Trap ETB01
50mm
SGH40
Marley Waste Pipe
WBE51
Waste Trap ETP10
WBE52
UGA40
Shower Waste Trap P50SSHC
Marley Waste Trap
ETP09
SG40
UAP43
SAV50
SE404
SW49
UBR41
UBR42
UYAR42
SEA402
SY42
UBR42
UYAR42
Marley 110 Twin Wall Pipe
UTHS420
UBR41
Philmac / Astore Compression Fittings
UYAR41
Marley H.D.P.E. Pipe
UBR41
UBR42
UYAR41
110mm
Wall Pipe
UTHS420
UBR42
UYAR41
ALWAYS INSIST ON
SW49
WBE51
Marley Soil & Vent Pipe
UGB40
UYAR41
MARLEY
pipesystems
(Pty) Ltd. Reg. No. 1991/003365/07
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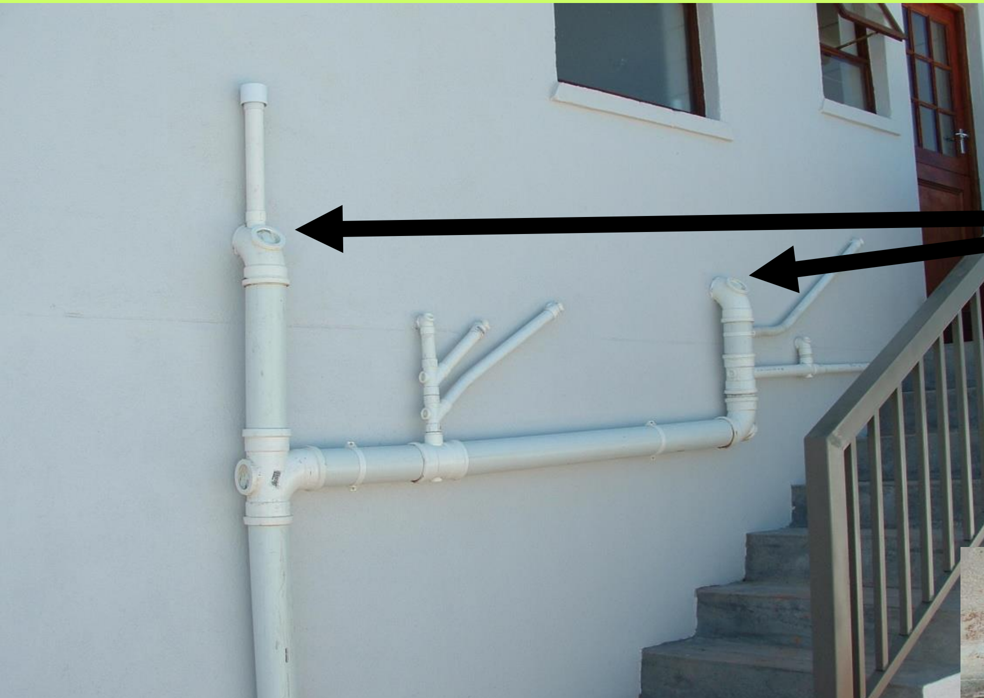
# SEWERAGE FITTINGS



INSPECTION EYES

RODDING EYE

# HEATING, COOLING AND INSULATION

*Although South Africa's climate is generally benign, some areas have harsh temperature extremes, most suffer the occasional very cold snap, and all are subject to oven-like weather at times. By and large, however, insufficient attention is paid in this country to the cooling and heating of the home. Good insulation not only adds immeasurably to domestic comfort but also saves substantially on fuel and electricity costs over the long term. Preventing heat loss in winter and creating summer coolness are easily attainable objectives – if they are carefully considered at the planning stage.*