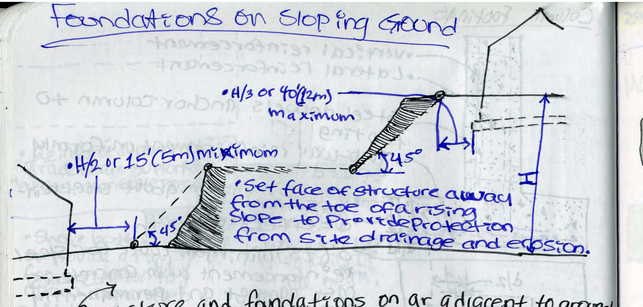
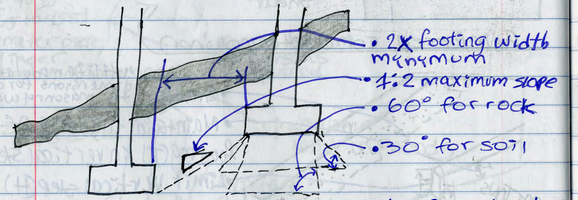
Foundations on Sloping Ground

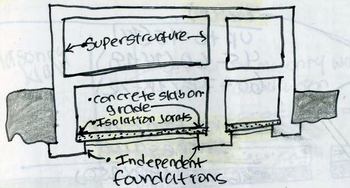


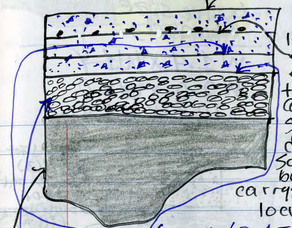
Structure and foundations on or adjacent to ground slopes exceeding 100% should adhere to the following requirements:



Closely spaced footings or adjacent footings located at different levels can cause overlapping soil stresses.

• Ground surface should not encroach on bearing prism of soil or rock.





• 4"(100) minimum slab thickness; thickness required depends on expected use and load conditions.

• Welded wire fabric reinforcement set at or slightly above the mid-depth of the slab controls thermal stresses, shrinkage cracking, and slight differential movement in the soil bed; a grid of reinforcing bars maybe required for slabs carrying heavier-than-normal floor loads.

• 6-mil (0.15 mm) polyethylene moisture barrier

• The American concrete institute recommends a 2"(51) layer of sand be placed over the moisture barrier to absorb excess water from the concrete during curing.

• Base course of gravel or crushed stone to prevent the capillary rise of groundwater; 4"(100) minimum.

• Stable, uniformly dense soil base; compaction may be required to increase soil stability, load bearing capacity, and resistance to water penetration.

Maximum Slab Dimensions

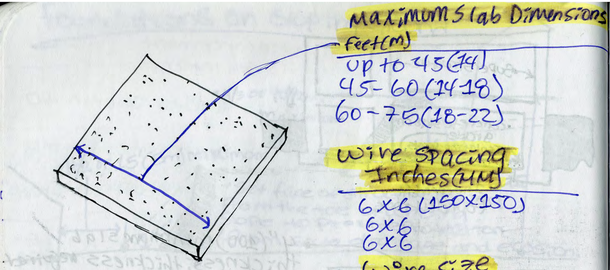
Feet(m)
up to 45(14)
45-60(14-18)
60-75(18-22)

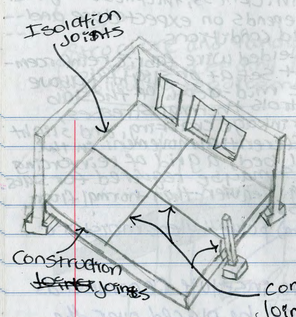
Wire Spacing Inches(MM)

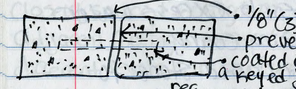
6x6 (150x150)
6x6
6x6

Wire Size (Number)

W1.4 x W1.4
W2.0 x W2.0
W2.9 x W2.9

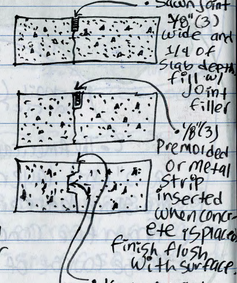






• 1/8"(3) radius prevent bond

• coated dowels or a keyed joint if required to prevent vertical differential movement.



• Sawn joint 3/8"(3) wide and 1/4 of slab depth fill w/ joint filler

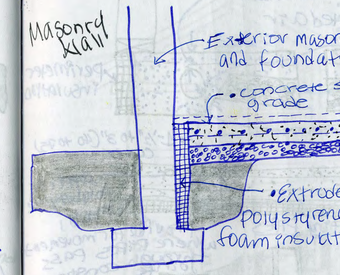
• 1/8"(3) premolded or metal strip inserted when concrete is placed finish flush with surface.

• Keyed joint

• Prevent bond by using a preformed metal or plastic joint material, or by applying curing compound to one side beg

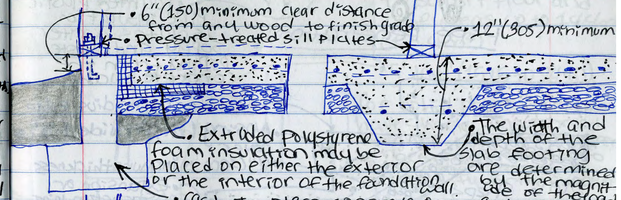
other side is placed

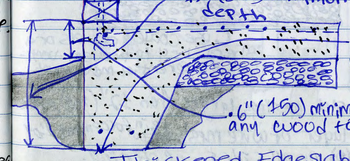
Concrete Slabs on Grade



• An independent footing should be used when a bearing wall or column transmits a heavy or concentrated load.

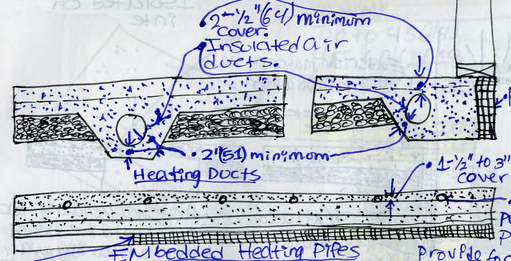
Stud Wall





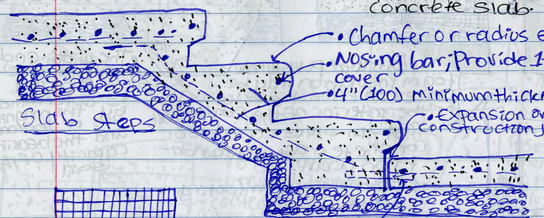
Thickened Edge Slab

CONCRETE SLABS ON GRADE



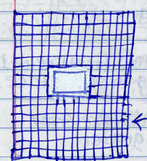
Pipe Penetrations

- Foamed plastic pipe insulation isolates water supply and waste piping from the concrete slab.



Slab Steps

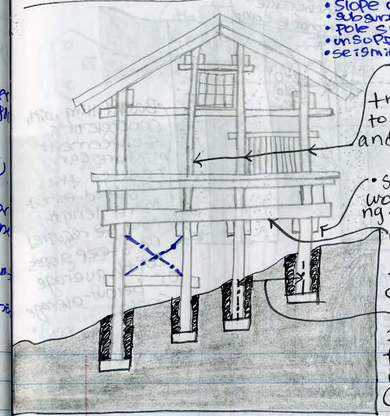
- Use coated dowels or a shear key to prevent vertical differential movement.



- For slab openings larger than 12" (305), extend second layer of wire mesh ~~of a~~ reinforcement 2'-0" (610) on all sides of opening.

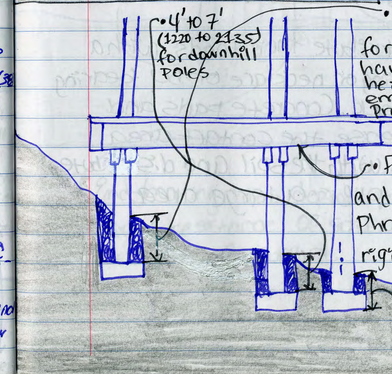
Slab Openings

POLE FOUNDATIONS



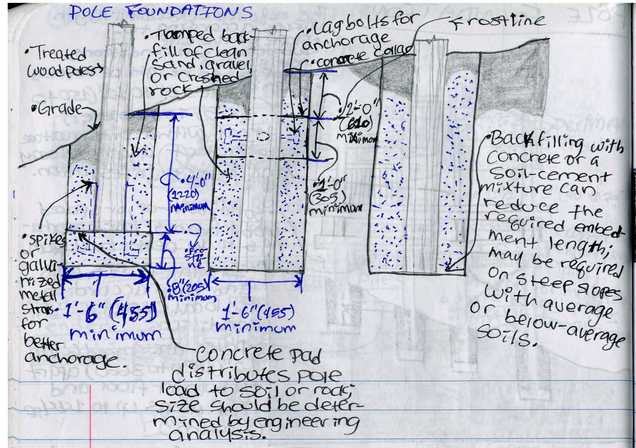
The required embedment length varies according to:
- Slope of the site
- Subsurface soil conditions
- Pole spacing
- Unsupported height of the poles
- Seismic zone

- Poles 6" to 12" (150 to 305) in diameter; treat with a preservative to protect against decay and insect infestation.
- Solid, built-up, or spaced wood beams; limit overhangs to ¼ of the backspan.
- Insulate floors, walls, and roof according to local climatic conditions.
- Poles are spaced 6' to 12' (1830 to 3660) apart to support floor and roof areas up to 144 sq (13.4 m²)



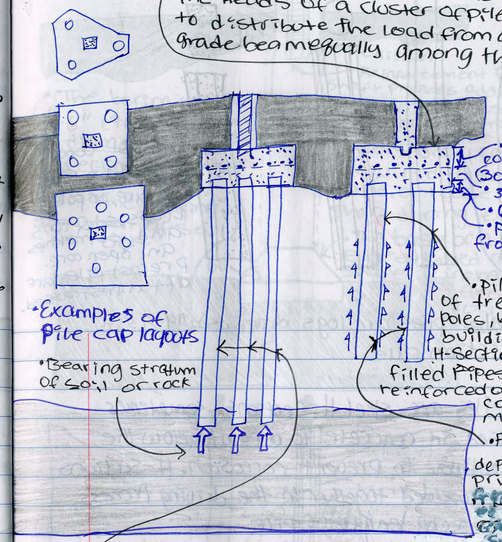
- 5' to 8' (1525 to 2440) for uphill poles; uphill poles have shorter unsupported heights but require deeper embedment in order to provide the necessary rigidity for the structure
- Floors should be designed and constructed as a diaphragm to transfer the rigidity of uphill poles to the rest of the structure.
- 4' to 5' (1220 to 1525)

POLE FOUNDATIONS



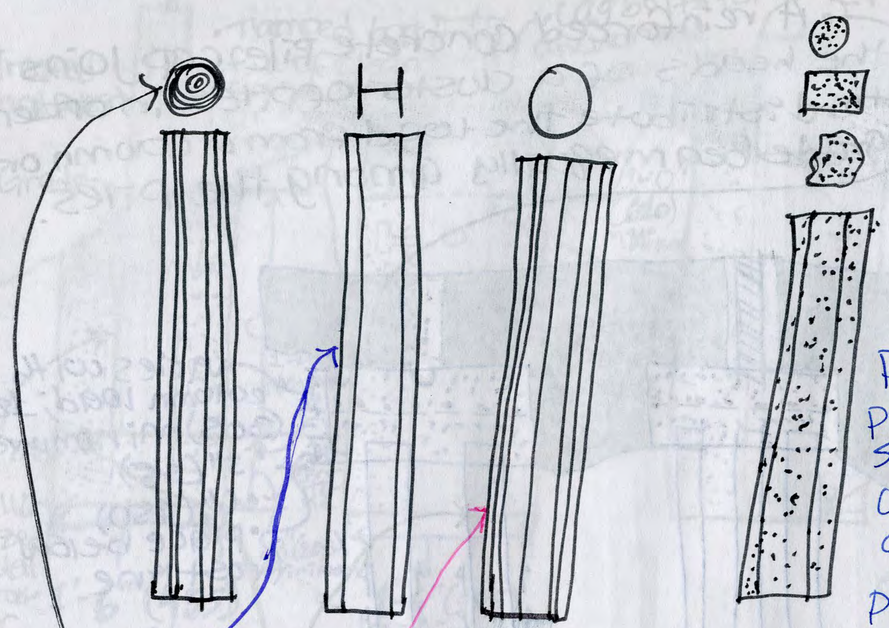
Poles may distribute their loads with a concrete footing or necklace or by bearing directly on rock. Concrete pads and collars increase the contact area of the poles with the soil and distribute their loads over a large area.

- A reinforced concrete pile cap joins the heads of a cluster of piles in order to distribute the load from a column or grade beam equally among the piles.



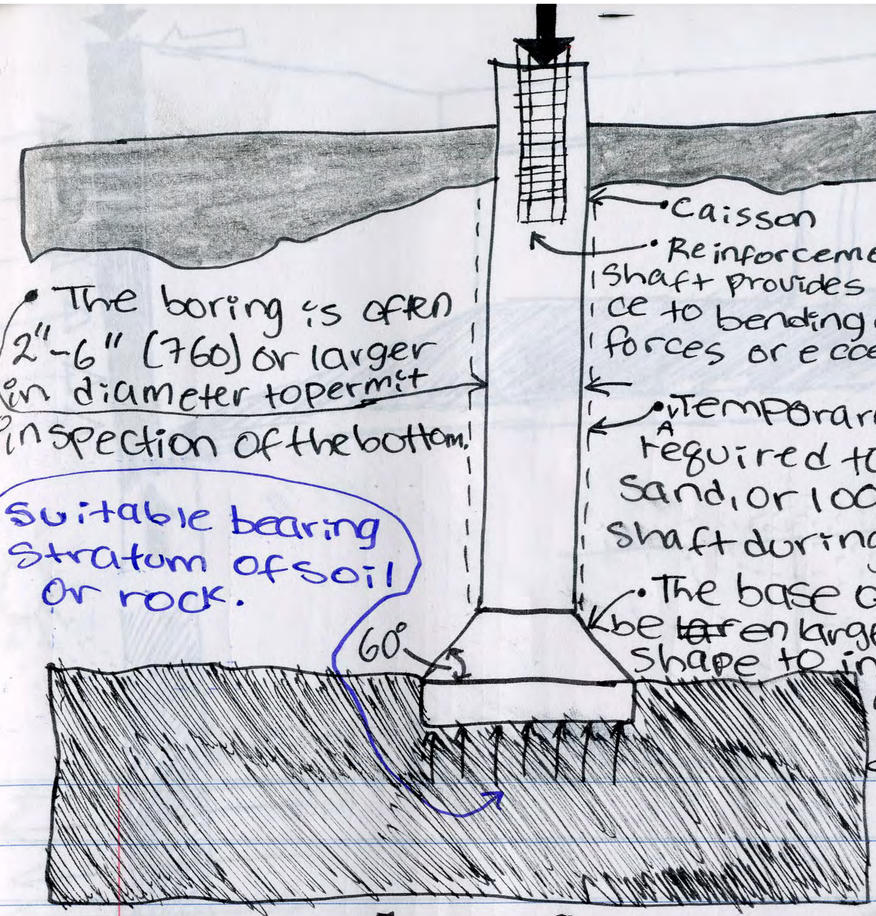
- Piles may be of treated timber poles, but for large buildings, steel H-sections, concrete-filled pipes, or precast reinforced or prestressed concrete are more common.
- Friction piles depends ~~on the~~ principally on the frictional resistance of a surrounding earth mass for support.

- End-bearing piles depend principally on the bearing resistance of soil or rock beneath their feet for support.

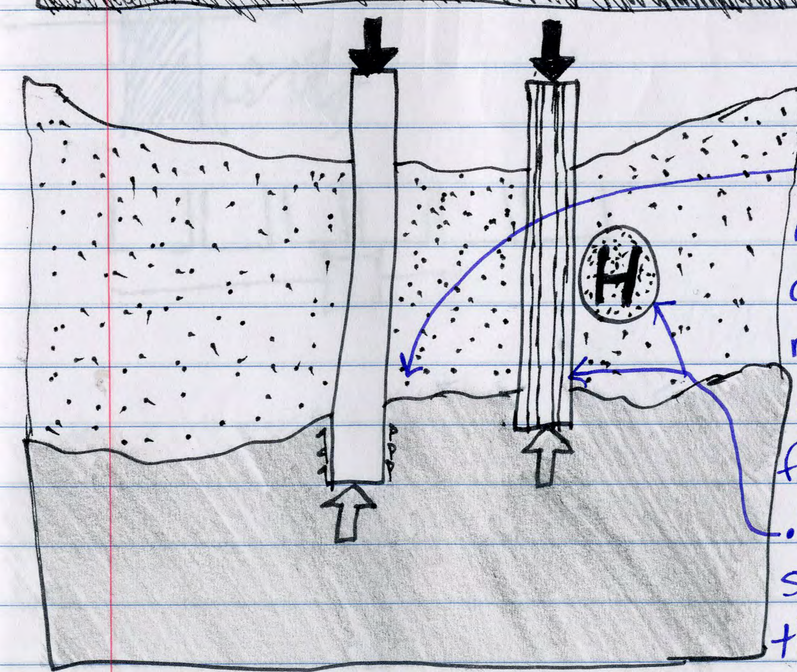


Precast concrete piles have round, square, or polygonal cross sections and sometimes an open core. Precast piles are often prestressed.

- Timber piles are logs driven usually as a friction pile.
- H-piles are steel H-sections, sometimes encased in concrete to a point below the water table to prevent corrosion. H-sections can be welded together in the driving process to form any length of pile
- Pipe piles are heavy steel pipes driven with the lower end either open or closed by a heavy steel plate or point and filled with concrete. An open-ended pipe pile requires inspection and excavation before being filled with concrete.



- Caisson
- Reinforcement in upper part of shaft provides additional resistance to bending caused by lateral forces or eccentric column loading.
- The boring is often 2"-6" (760) or larger in diameter to permit inspection of the bottom.
- Temporary casing may be required to seal out water, sand, or loose fill from the shaft during excavation.
- Suitable bearing stratum of soil or rock.
- The base of a caisson may be enlarged into a bell shape to increase its bearing area and resist uplift from soil expansion.



- Socketed caissons are drilled into a stratum of solid rock in order to gain additional frictional support.
- Rock caissons are socketed caissons that have a steel H-section core within a concrete-filled pipe casing.