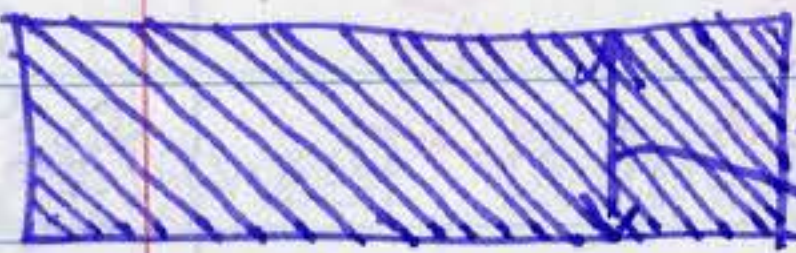


- 1" (25) tongue & groove flooring or 1/2" (13) plywood over wood planks at least 3" (75) thick.
- 6x10 minimum for floor beams; 4x6 minimum for roof beams and truss members
- 8x8 minimum for columns supporting floor loads; 6x6 minimum for columns supporting only roof loads

• wood may be chemically treated to reduce its flammability.



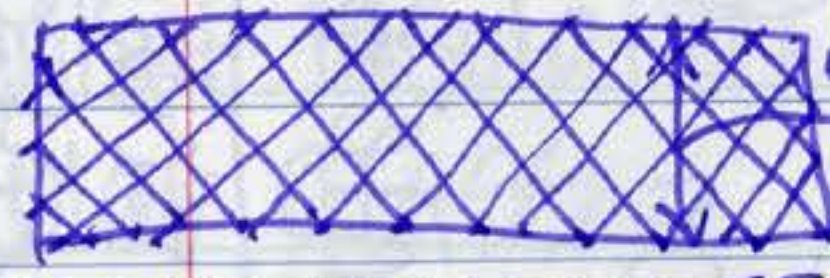
- solid reinforced concrete
- 6-1/2" (165) 4-hour rating
- 6" (150) 3-hour rating
- 5" (125) 2-hour rating
- 3-1/2" (90) 1-hour rating



- solid brick masonry
- 8" (205) 4-hour rating
- 6" (150) 2-hour rating
- 4" (100) 1-hour rating

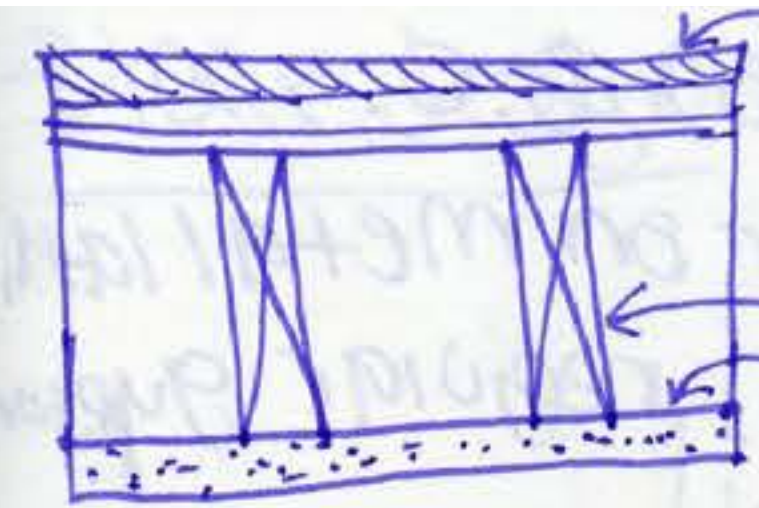


- 10" (255) 4-hour rating
- brick cavity wall



- concrete masonry wall
- 8" (205) 2 to 4-hour rating
- 6" (150) 1-1/2 hour rating
- 4" (100) 1-hour rating

• Ratings of all masonry walls may be increased with a coating of portland cement or gypsum plaster.



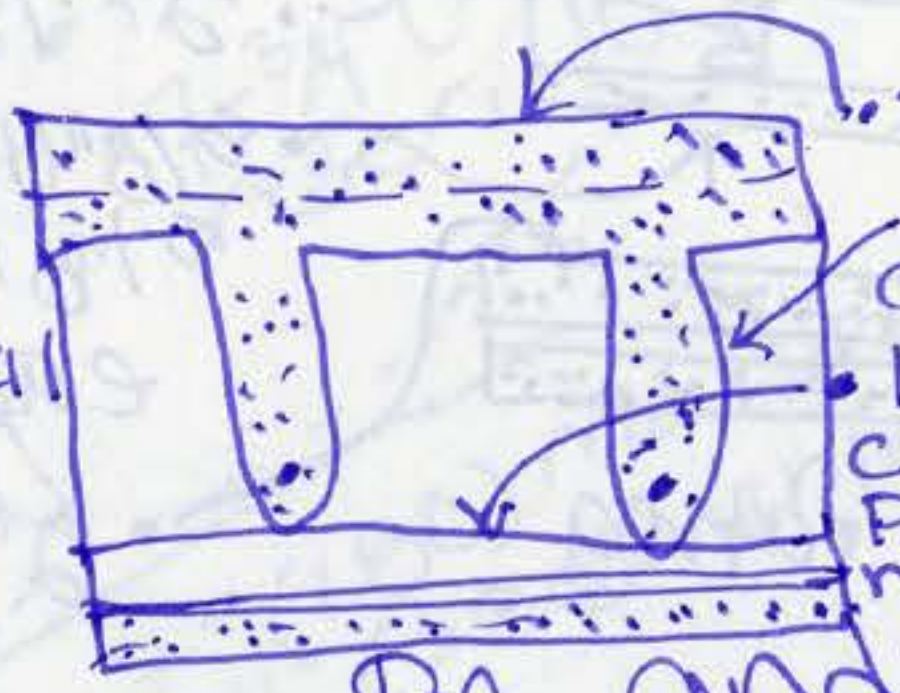
1-hour Rating

- Double wood floor
- wood joists @ 16" (405) O.C.
- 1/2" (13) Type X gypsum board or 5/8" (16) gypsum plaster on metal lath



4-hour rating

- 6-1/2" (165) regular or 5" (125) expanded shale concrete slab

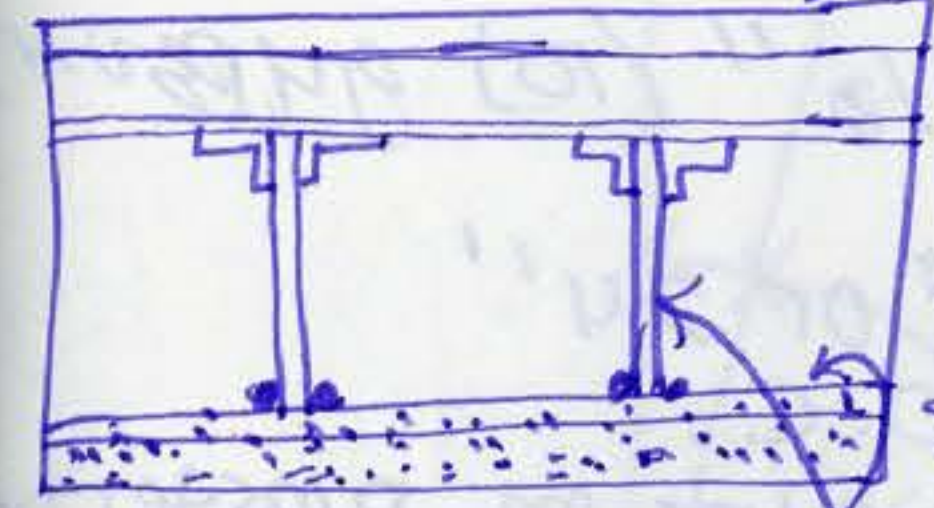


## Floors and Roofs

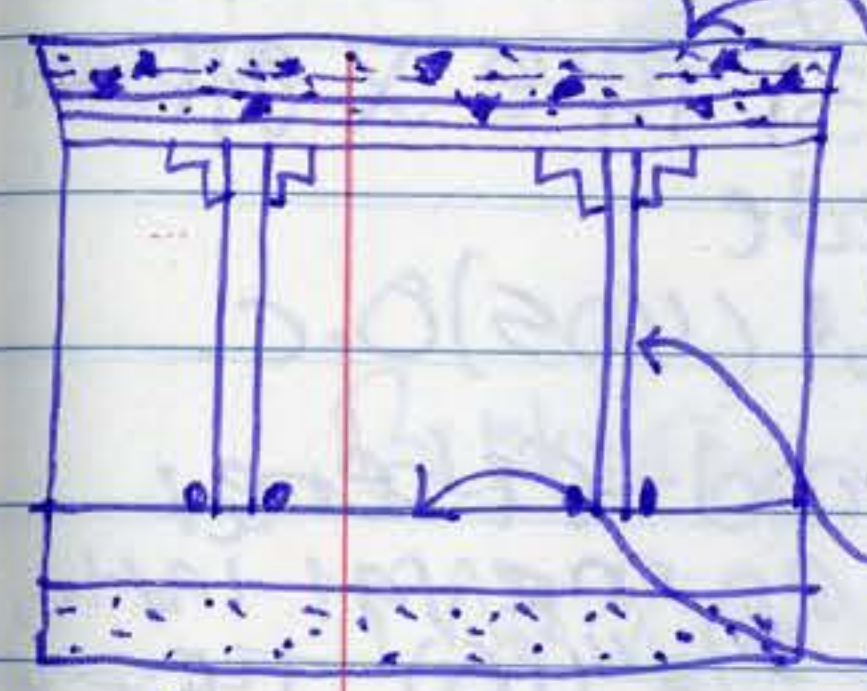
Fire-rated construction

- 3" (75) slab
- reinforced concrete joists
- 1" (25) vermiculite gypsum plaster on metal lath attached

to 3/4" (19) cold-rolled channels @ 12" (305) o.c.

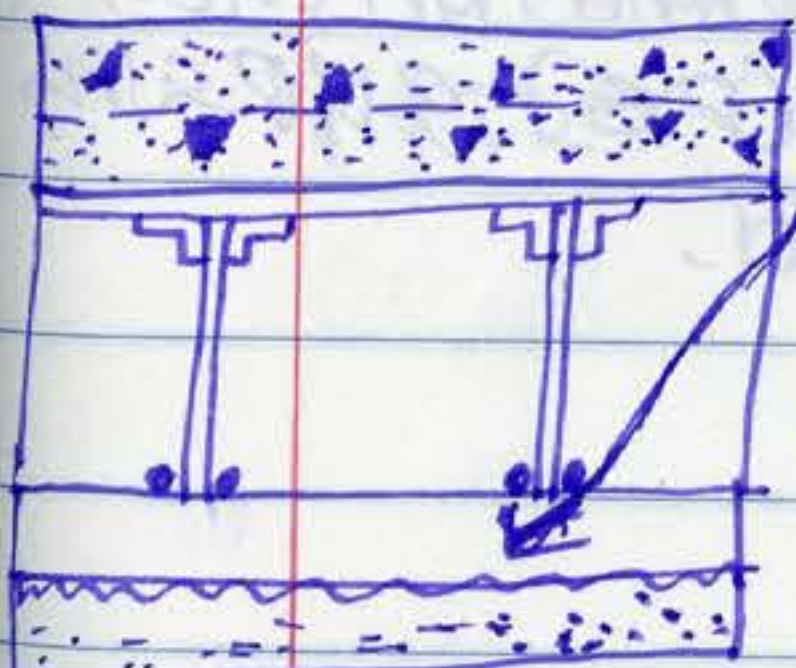


- Fire-resistant roofing over wood fiber insulation board and 1-1/2" (38) steel roof deck

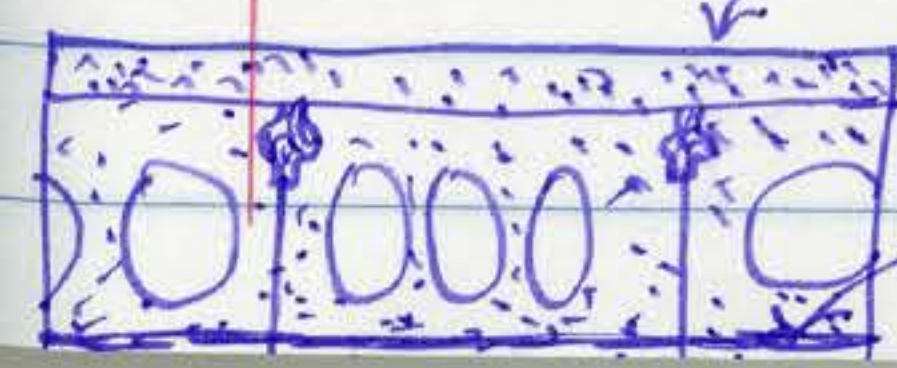


2-hour Rating

- Steel joists
- 3/4" (19) gypsum plaster on metal lath.
- 2" (51) reinforced concrete slab on steel form units
- Steel joists
- 5/8" (16) Type X gypsum board or perlite plaster on 3/8" (10) perforated gypsum lath attached to 3/4" (19) cold-rolled channels.



- Similar to above but with 2-1/2" (64) slab and 3/4" (19) vermiculite gypsum plaster on metal lath

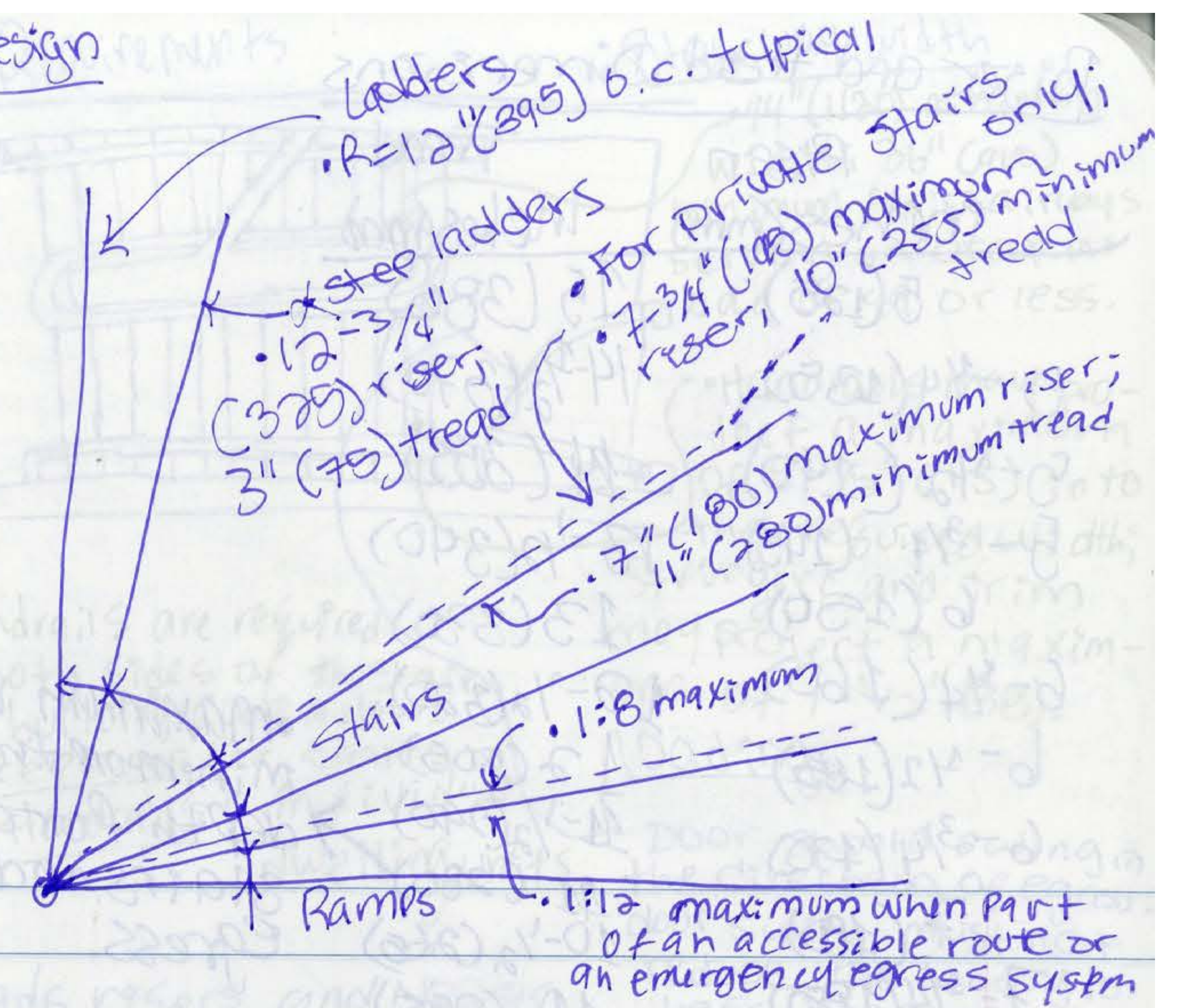


- 1-1/2" (38) sand-gravel concrete topping
- 8" (205) precast concrete slabs w/all joints grouted

- 2x4 studs @ 16" (405) o.c.
- 5/8" (16) gypsum plaster on metal lath, or two layers 1/2" (13) regular gypsum board on each side
- 2-1/2" (64) steel studs @ 16" (405) o.c.
- 5/8" (16) gypsum plaster on metal lath, or 5/8" (16) type X gypsum board on each side
- 1-hour rating
- 2" (51) solid gypsum plaster partition with 3/4" (19) channels and 3/8" (10) gypsum lath
- Steel studs @ 16" or 24" (405 or 610) o.c.
- 3/4" (19) per lite gypsum plaster on 3/8" (10) perforated gypsum lath, or two layers 1/2" (13) type X gypsum board on each side
- 2x4 studs @ 16" (405) o.c.
- 7/8" (22) heat wood-fibered gypsum plaster on metal lath, or two layers 5/8" (16) type X gypsum board on each side
- 2-hour rating
- 2" (51) solid gypsum plaster partition or 1/2" type X gypsum board on each side of 1" (25) gypsum core board.

Walls and Partitions

Stair design



Building codes regulate the minimum and maximum dimensions of risers and treads. For comfort, the riser and tread dimensions can be proportioned according to either of the following formulas:

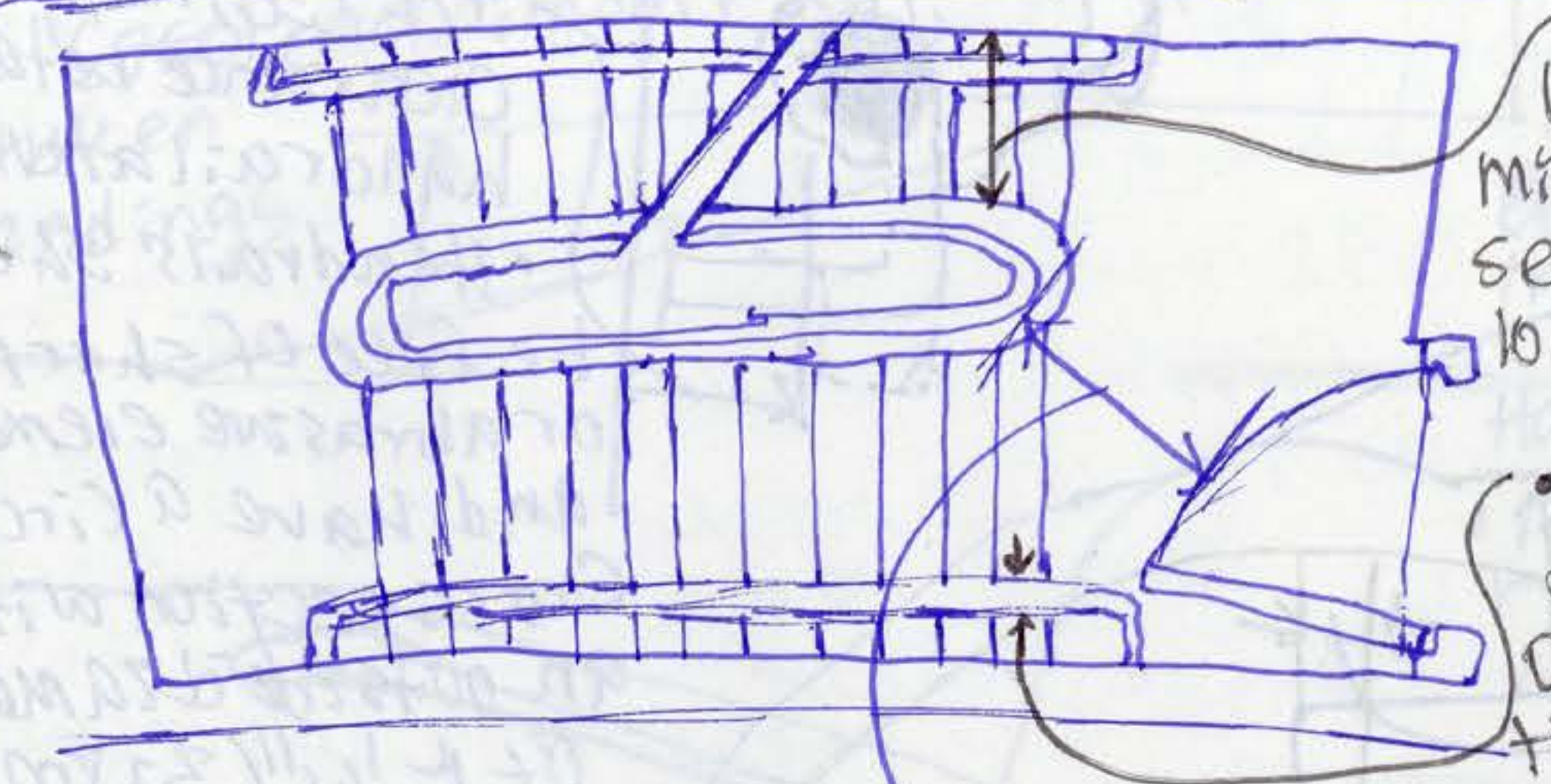
- Tread (inches) + 2x riser (inches) = 24 to 25
- riser (inches) x tread (inches) = 72 to 75

Riser and tread Dimensions

Riser inches (mm)	Tread inches (mm)
5 (125)	15 (380)
5-1/4 (135)	14-1/2 (370)
5-1/2 (140)	14 (355)
5-3/4 (145)	13-1/2 (340)
6 (150)	13 (330)
6-1/4 (160)	12-1/2 (320)
6-1/2 (165)	12 (305)
6-3/4 (170)	11-1/2 (290)
7 (180)	11 (280)
7-1/4 (185)	10-1/2 (265)
7-1/2 (190)	10 (255)

• maximum riser height minimum tread depth for accessible stairs and emergency egress.

Stair Requirements



• Handrails are required on both sides of the stair. The building code allows exceptions for stairs in individual dwelling units.

Treads, risers, and nosings

• A minimum of three risers per flight is recommended to prevent tripping and may be required by the building code.

• 34" to 38" (865 to 965) height above the leading edge of the stair treads or nosings.

Stairway width

• 44" (1130) minimum width; 36" (915) minimum for stairways serving an occupant load of 49 or less.

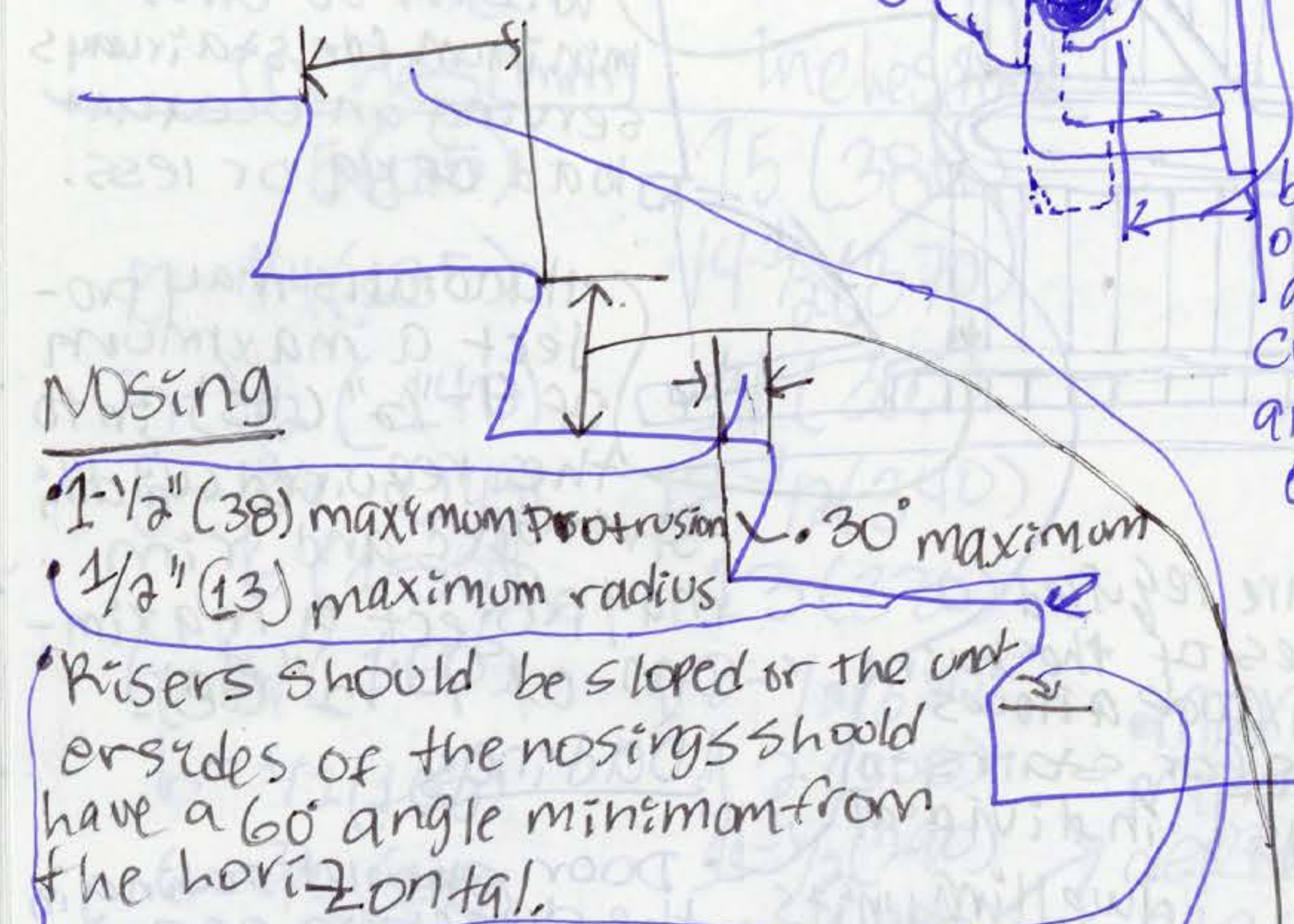
• Handrails may project a maximum of 4-1/2" (115) into the required width; stringers and trim may project a maximum of 1-1/2" (38).

Loadings

• Door should swing in the direction of egress. door swing must not reduce the landing to less than one half of its required width.

• when fully open, the door must not intrude into required width by more than 7" (180).

# ADA Accessibility Guidelines



## Nosing

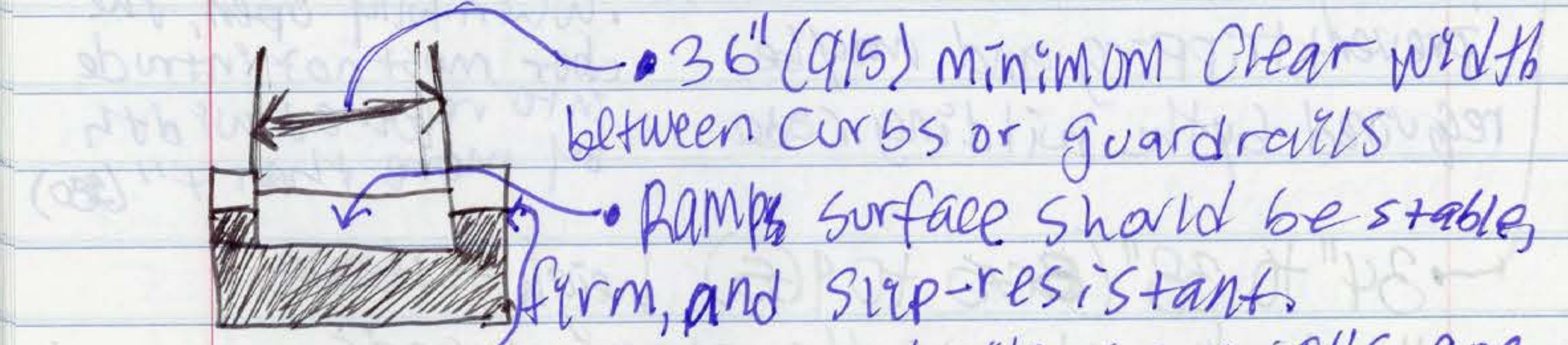
- 1/2" (38) maximum protrusion
- 30° maximum angle
- 1/4" (13) maximum radius
- Risers should be sloped or the undersides of the nosings should have a 60° angle minimum from the horizontal.

## Handrails

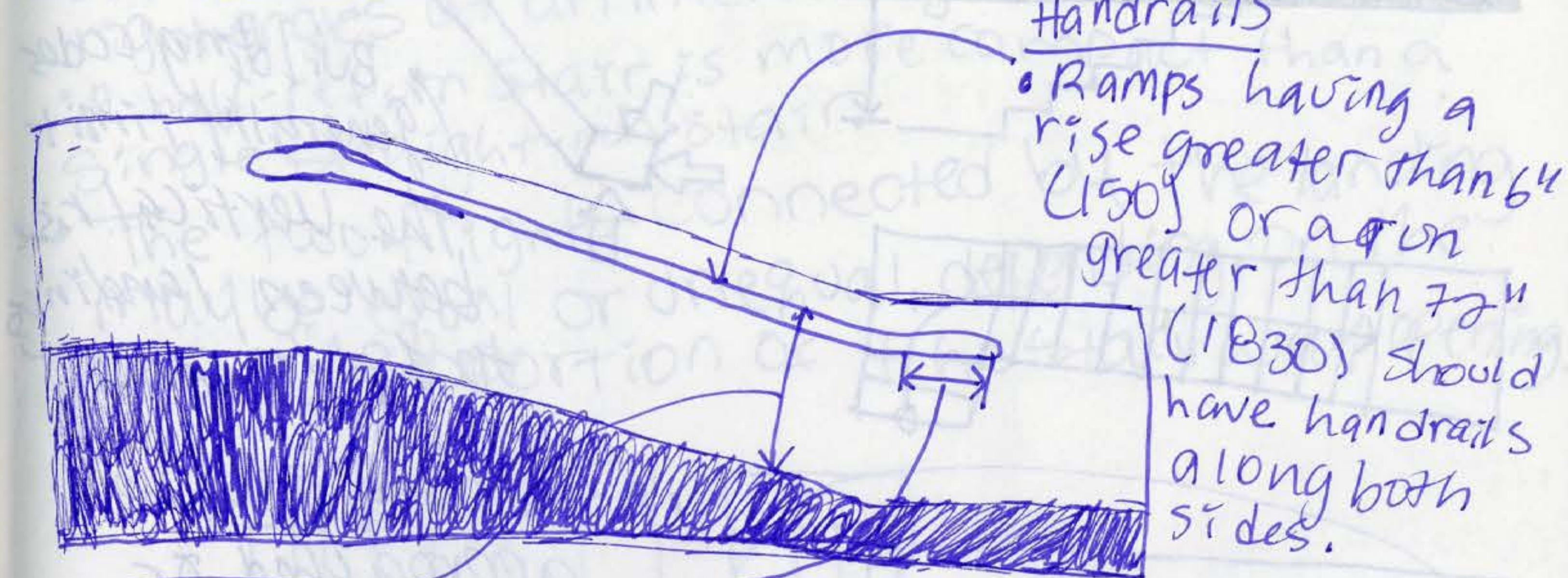
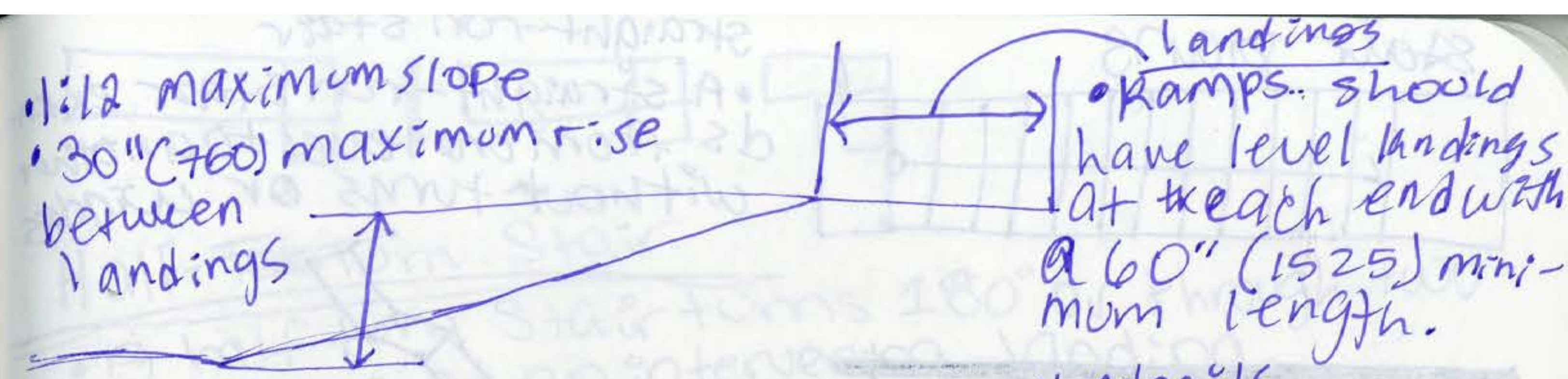
- 1/2" (38) minimum clearance between handrail and wall
- Handrails should be free of sharp or abrasive elements and have a circular cross-section with an outside diameter of 1 1/4" (32) minimum and 2" (51) maximum.

## Ramp Risers and Treads

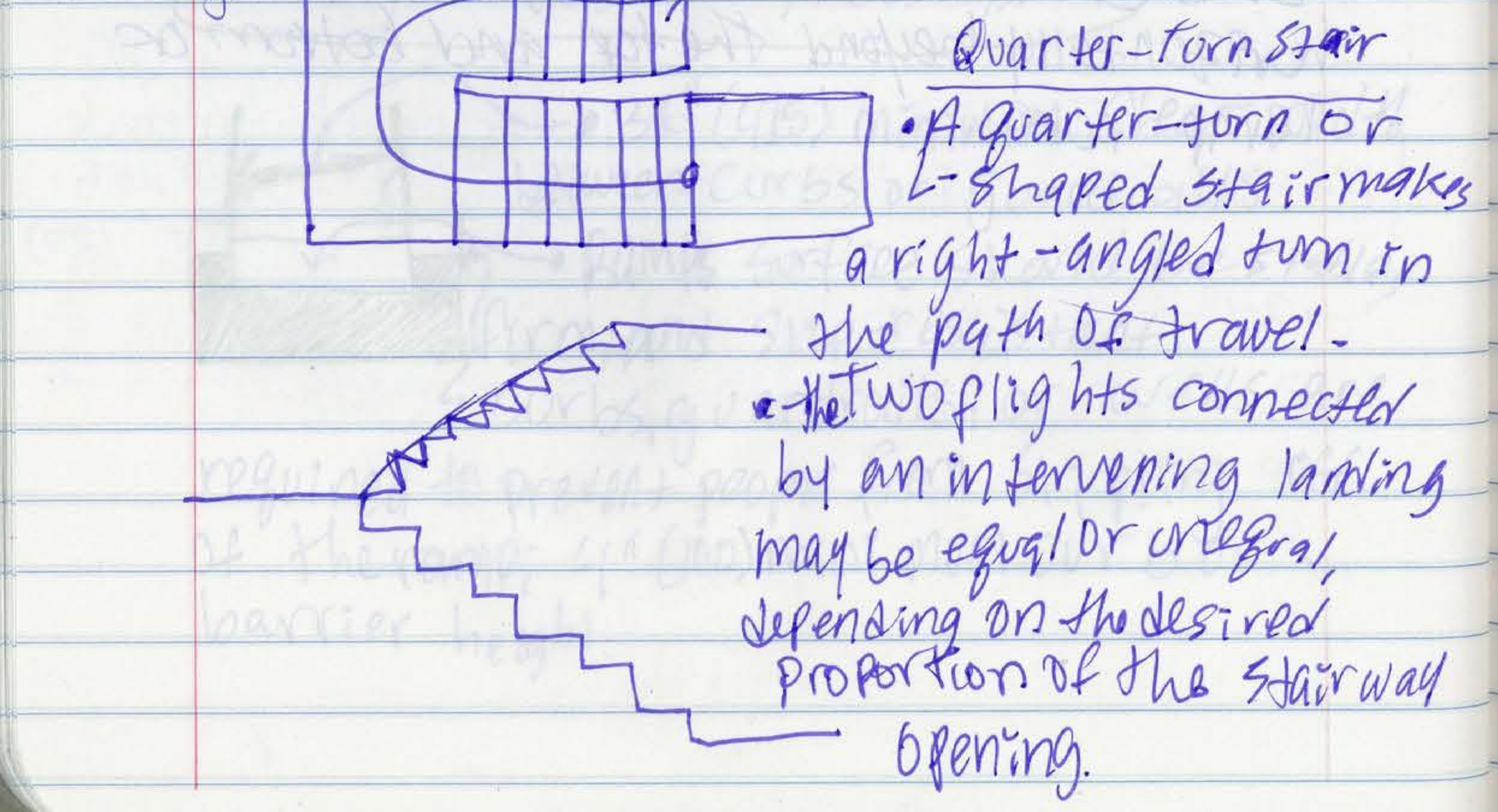
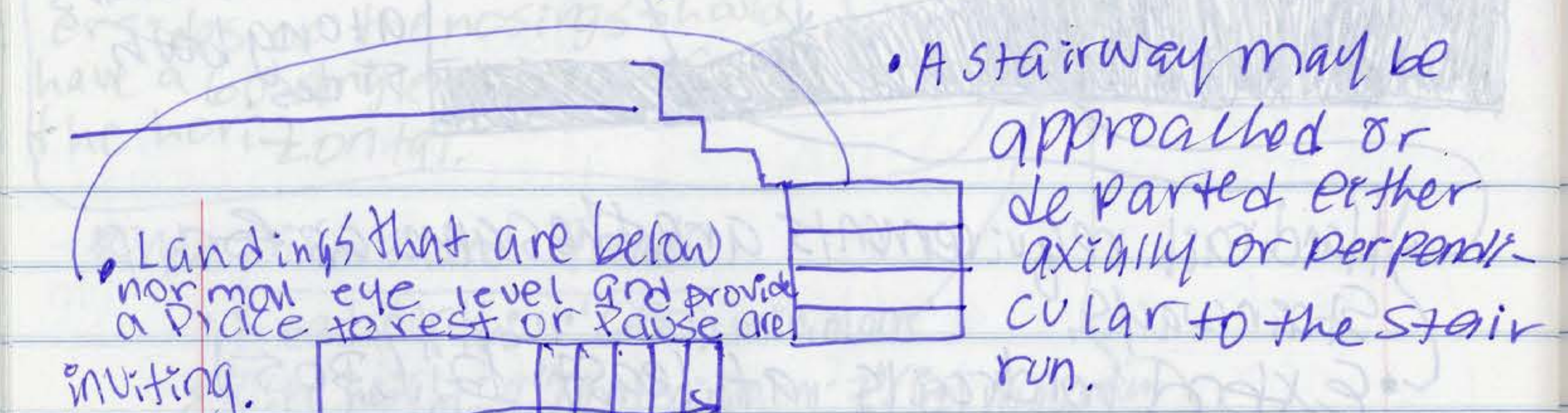
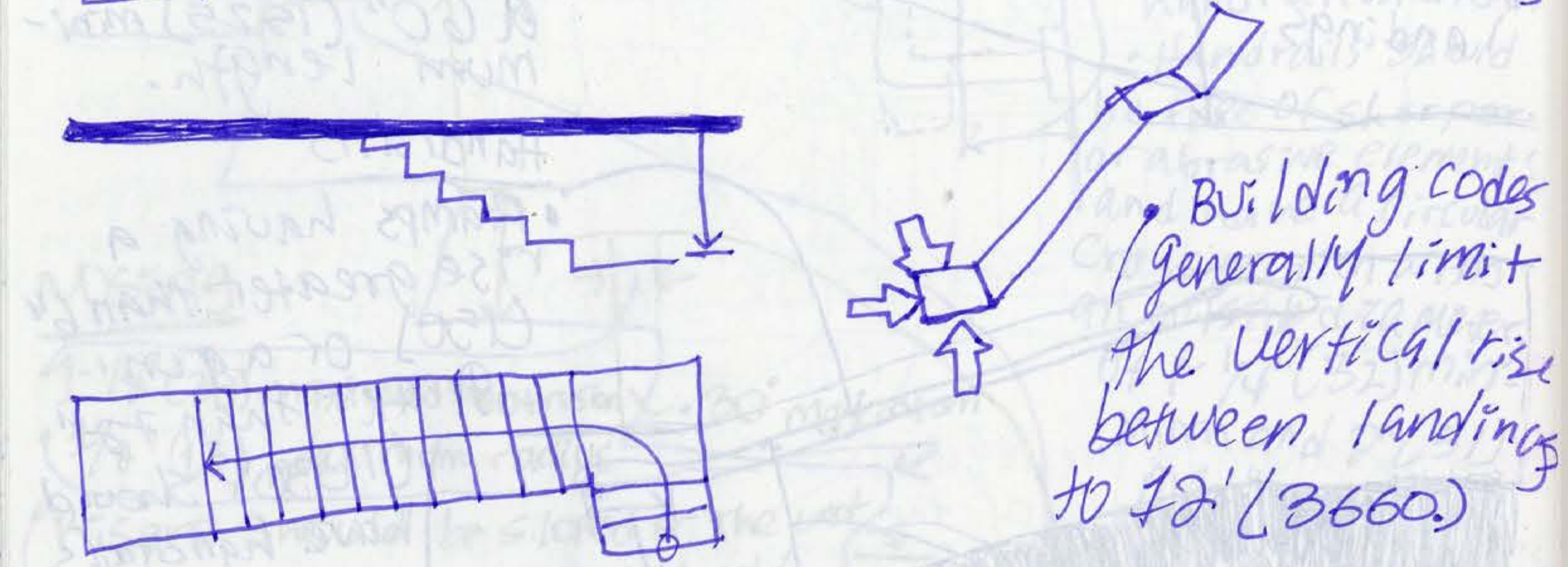
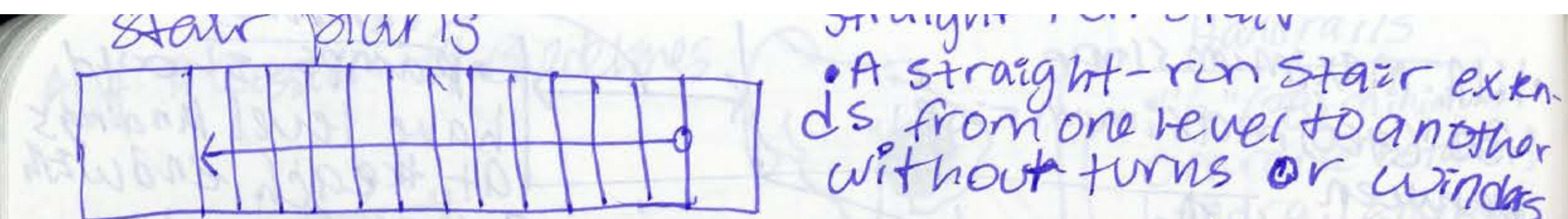
- Tread depth: 11" (280) minimum
- Riser height: 4" (100) minimum; 7" (180) maximum



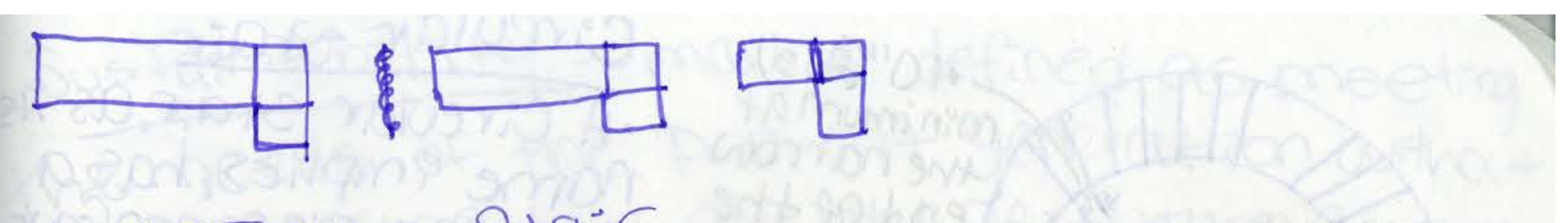
- 36" (915) minimum clear width between curbs or guardrails
- Ramps surface should be stable, firm, and slip-resistant
- curbs, guardrails, or walls are required to prevent people from slipping off of the ramp; 4" (100) minimum curb or barrier height.



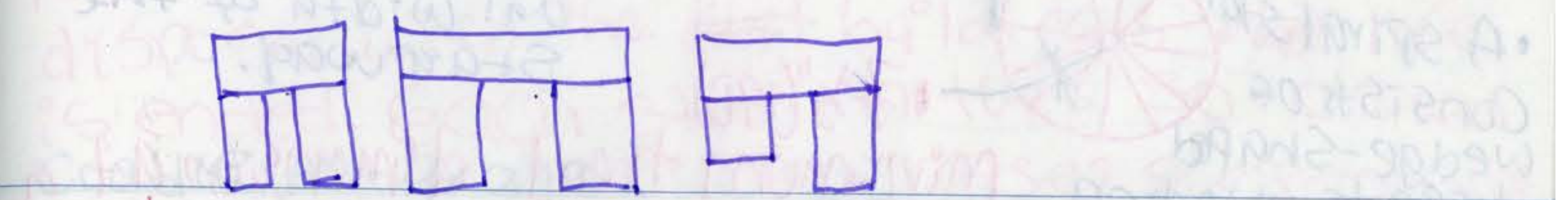
- Handrail requirements are the same as for stairways.
- Extend handrails at least 12" (305) horizontally beyond the top and bottom of ramp runs.



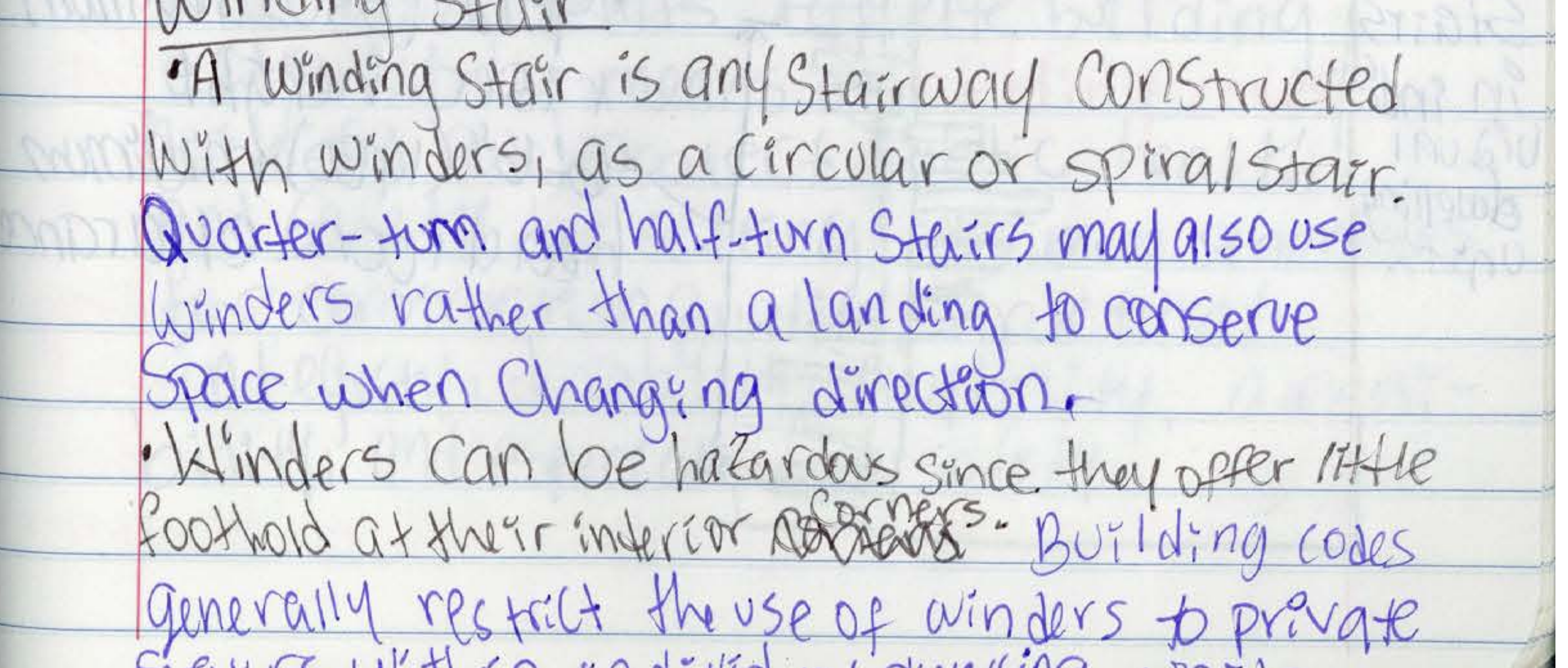
- A straight-run stair extends from one level to another without turns or windings
- Building codes generally limit the vertical rise between landings to 12' (3660)
- A stairway may be approached or departed either axially or perpendicular to the stair run.
- Landings that are below normal eye level and provide a place to rest or pause are inviting.
- A quarter-turn or L-shaped stair makes a right-angled turn in the path of travel.
- The two flights connected by an intervening landing may be equal or unequal, depending on the desired proportion of the stairway opening.

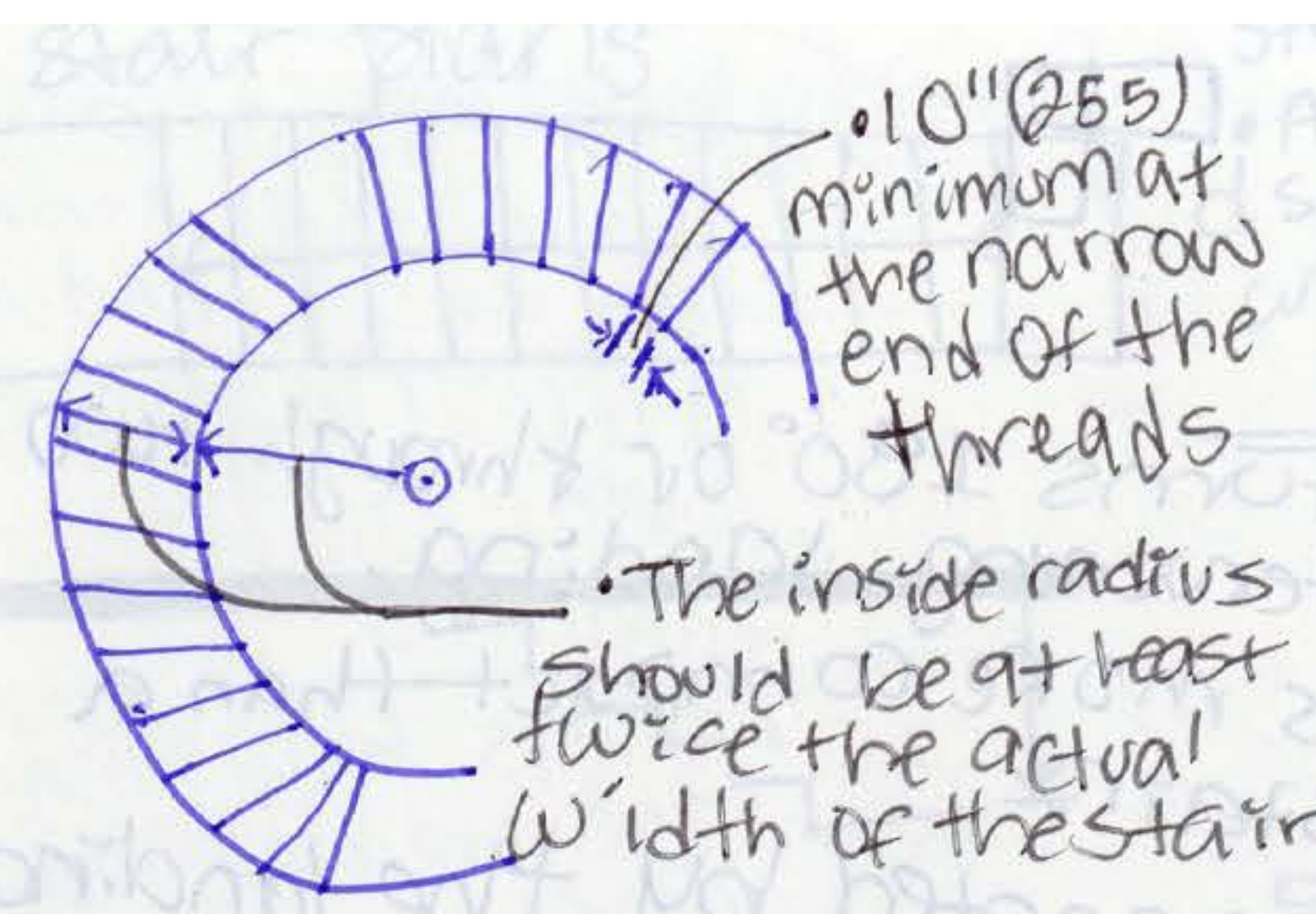


- ## Half-Turn Stair
- A half-turn stair turns 180° or through two right angles at an intervening landing.
  - A half-return stair is more compact than a single straight-run stair.
  - The two flights connected by the landing may be equal or unequal, depending on the desired proportion of the stairway opening.



- ## Winding Stair
- A winding stair is any stairway constructed with winders, as a circular or spiral stair.
  - Quarter-turn and half-turn stairs may also use winders rather than a landing to conserve space when changing direction.
  - Winders can be hazardous since they offer little foothold at their interior corners. Building codes generally restrict the use of winders to private stairs within individual dwelling units.



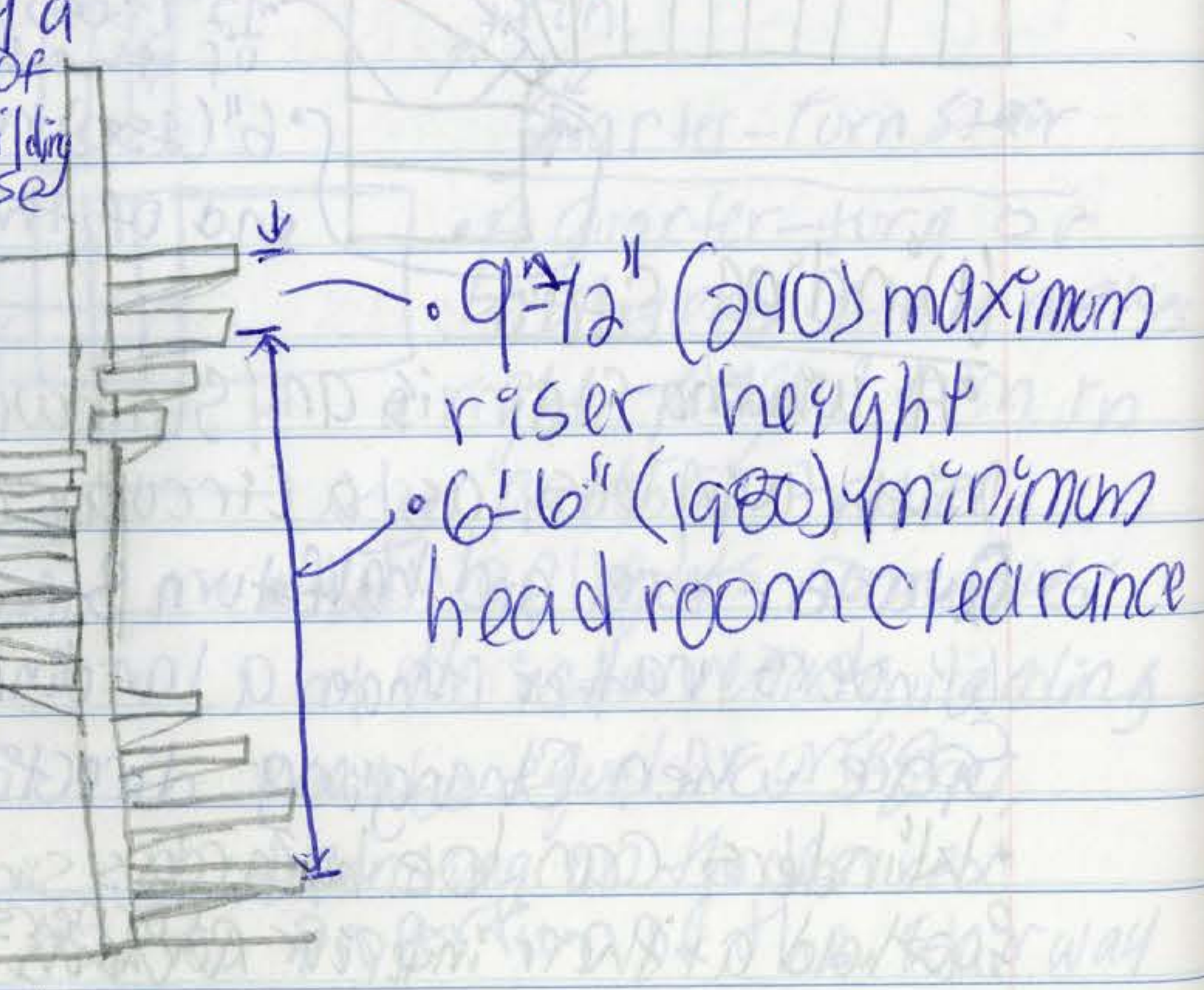


**Circular stair**  
 • A circular stair, as its name implies, has a circular plan configuration. Even though a circular stair is constructed with winders, the building code may allow its use as part of the means of egress from a building if its inner radius is at least twice the actual width of the stairway.

**Spiral Stair**

• A spiral stair consists of wedge-shaped treads winding around and supported by a central post.

• Spiral stairs occupy a minimum amount of floor space, but building codes permit their use only as private stairs in individual dwelling units.



• 7 1/2" (190) minimum thread dimension at a point 12" (305) in from the narrow end of the treads.

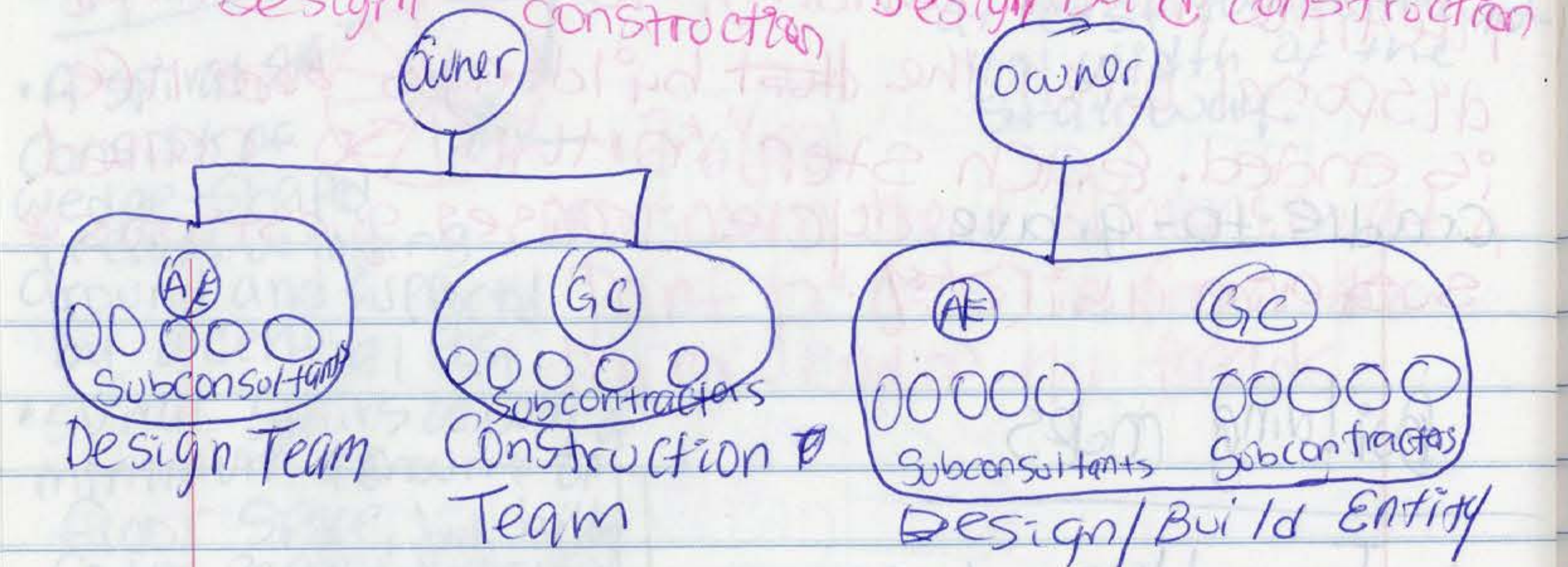
**Sustainability** - may be defined as meeting the needs of the present generation without compromising the ability of future generations to meet their needs.

Sustainability must be addressed on a life-cycle basis, from the origins of the materials for a building, through the manufacture and installation of these materials and their useful lifetime in the building, to their eventual disposal when the building's life is ended. Each step in this so-called cradle-to-grave cycle raises questions of sustainability.

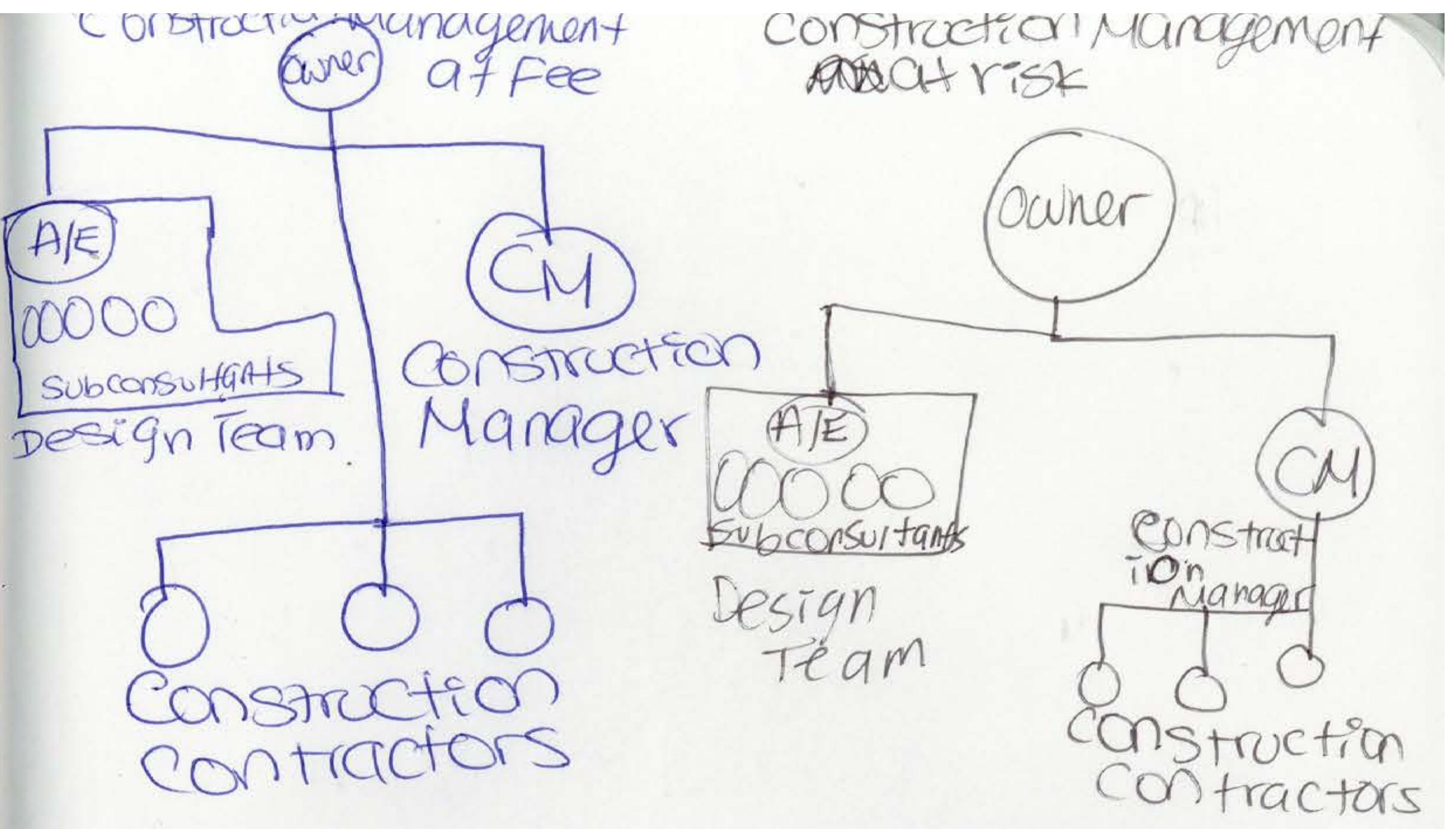
**Building codes**

In addition to its zoning ordinances, local governments regulate building activity by means of building codes. Building codes protect public health and safety by setting minimum standards for construction quality, structural integrity, durability, livability, accessibility, and especially fire safety.

The American National Standards Institute (ANSI) is another private organization that develops and certifies North American standards for a broad range of products, such as exterior windows, mechanical components of buildings, and even the accessibility requirements referenced within the IBC itself (ICC/ANSI A117.1).



In design/bid/build project delivery, the owner contracts separately with the architect/engineer (A/E) design team and the construction general contractor (GC). In a design/build project, the owner contracts with a single organizational entity that provides both design and construction services.



In its traditional role, a construction manager (CM) at fee provides project management services to the owner and assists the owner in contracting directly for construction services with one or more construction entities. A CM at fee is not directly responsible for the construction work itself. A CM at risk acts more like a general contractor and takes on greater responsibility for construction quality, schedule, and costs. In either case, the A/E design team also contracts separately with the owner.