

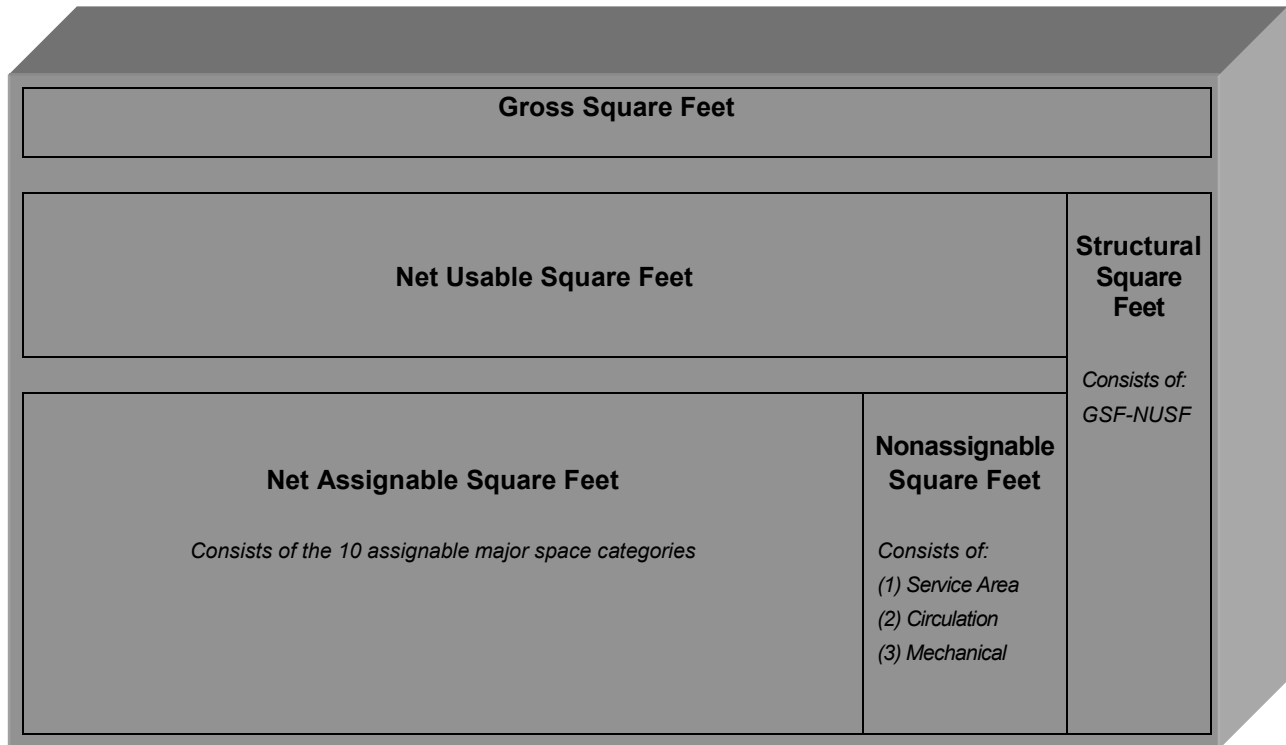
WASHINGTON STATE UNIVERSITY

BUILDING AREA MEASUREMENT

CATEGORIES OF BUILDING MEASUREMENT

1. *Gross Square Feet (GSF)* = *Net Usable Square Feet + Structural Square Feet*
2. *Net Usable Square Feet (NUSF)* = *Assignable Square Feet + Nonassignable Square Feet*
3. *Net Assignable Square Feet (NASF)* = *Sum of the 10 Major Space Use Categories of Assignable Space*
4. *Nonassignable Square Feet* = *Sum of the Three Major Space Use Categories of Nonassignable Space*
5. *Structural Square Feet* = *Gross Square Feet – Net Usable Square Feet*

CONCEPTUAL FRAMEWORK FOR ANALYZING BUILDING SQUARE FOOTAGE



I. DEFINITIONS OF BUILDING SQUARE FOOTAGES

1. GROSS SQUARE FEET (GSF)

-See Figure 1 for graphical depiction (page 9)

- A. **Definition.** The sum of all areas on all floors of a building included within the outside faces of its exterior walls, including all vertical penetration areas, for circulation and shaft areas that connect one floor to another.
- B. **Basis for Measurement.** Gross Square Feet is computed by physically measuring or scaling measurements from the outside faces of exterior walls, disregarding architectural and structural projections such as cornices, pilasters, buttresses, etc., that extend beyond the exterior building wall faces. Exclude areas having less than a 3-foot clear ceiling height unless the criteria of a separate structure are met. Round up GSF to the nearest whole number. Within the building, count vertical circulation space-whether floored or not, such as vertical mechanical, electrical & elevator shafts at each floor.

Examples of Included Spaces:

- All interior assignable spaces
- Basements and attics
- Garages
- Enclosed porches or portion of porch covered
- Penthouses
- Mechanical equipment floors (interstitial)
- Public areaways, lobbies, and mezzanines
- Inside balconies utilized for operational functions
- Enclosed unfinished areas, if $\geq 3'0''$ in height
- Vertical circulation w/wo floors (count at each floor)
- Mechanical and electrical shafts (count at each floor)
- Elevators and elevator shafts (count at each floor)
- Piers (structural only-count surface area of decking)

Examples of Excluded Spaces:

- Attics without flooring
- Parking lots (uncovered)
- Light wells
- Playing fields
- Portions of upper floors eliminated by rooms or lobbies which rise above single floor height
- Floored areas with less than 3.0' clear headroom (unless they can be properly designated and used as mechanical or custodial areas)
- All open to the weather spaces with no overhead covering (e.g. exterior corridors, porches, balconies, courts, etc.)

Measured in terms of Gross Square Feet (GSF),

$$GSF = Net Usable Square Feet + Structural Square Feet$$

1. GROSS SQUARE FEET (GSF) continued.....

- C. **Description.** GSF is the sum of all floor areas of a building, based on exterior dimensions. GSF includes the sum of ASF and NSF, plus the thickness of the walls. In addition to all the internal floored spaces obviously covered above, Gross Square Feet should include the following: excavated basement areas; interstitial space (i.e., mechanical floor or walkways), mezzanines, penthouses, and attics; garages; covered porches, whether walled or not; inner or outer balconies to the extent of a drip line from a roof or balcony immediately above, whether walled or not, if they are utilized for operational functions; and corridors or walkways, whether walled or not, provided they are either within the outside face lines of the building to the extent of the roof drip line or, if covered, to the extent of their cover's drip line. The footprints of stairways, elevator shafts, and vertical duct shafts are to be counted as gross area on each floor through which they pass.
- D. **Limitations.** Exclude open areas such as parking lots, playing fields, pools, courts, light wells, and portions of upper floors eliminated by spaces or lobbies that rise above single-floor ceiling height. Exclude unexcavated basement areas.
- E. **Exception.** Include top, unroofed floor of parking structures where parking is available.

2. NET USABLE SQUARE FEET (NUSF)

- A. **Definition.** The sum of all areas on all floors of a building either assigned to, or available for assignment to, an occupant or specific use, or necessary for the general operation of a building.
- B. **Basis for Measurement.** Net Usable Square Feet is computed by summing the Net Assignable Square Feet and the Nonassignable Square Feet.

Measured in terms of Net Usable Square Feet (NUSF),

$$NUSF = Net\ Assignable\ Square\ Feet + Nonassignable\ Square\ Feet$$

- C. **Description.** Included should be space subdivisions of the 10 assignable major space use categories and the three nonassignable space categories.
- D. **Limitations.** Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas defined as structural should not be included.

3. NET ASSIGNABLE SQUARE FEET (NASF)

-See Figure 2 for graphical depiction (page 10)

- A. **Definition.** The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use.
- B. **Basis for Measurement.** Net Assignable Square Feet is computed by physically measuring or scaling measurements from the inside faces of surfaces such as walls, partitions or doors, etc., that form the boundaries of the designated areas. Space is to be covered by a ceiling 3'-0" or higher, and preferably but not required in special circumstances, enclosed on all sides by walls, partitions, doors, or functionally equivalent. Round up ASF to the nearest whole number. Include columns or similar structural elements, built-in or freestanding furniture and equipment, and alcoves and other similarly recessed areas. Exclude areas having less than a 3-foot clear ceiling height unless the criteria of a separate structure are met.

Measured in terms of Net Assignable Square Feet (NASF),

NASF = Sum of Areas Designated by the 10 Assignable Major Space Use Categories

- C. **Description.** Included are the space subdivisions of the 10 major space use categories for assignable space:

THE TEN MAJOR SPACE USE CATEGORIES	
ROOM CATEGORY	CATEGORY DESCRIPTION
000	UNCLASSIFIED
100	CLASSROOMS
200	LABS
300	OFFICES
400	STUDY FACILITIES
500	SPECIAL USE
600	GENERAL USE
700	CENTRAL SUPPORT
800	HEALTH CARE
900	RESIDENTIAL

NASF (sometimes referred to as Assignable Square Feet or ASF) is the sum of the areas inside the walls or vertical projections (in the case of covered, unenclosed NASF) of the spaces that can be used by occupants to carry out their functions. Circulation space within a suite of rooms is included in ASF. Circulation space which is not within an assigned suite of rooms (e.g., space in "public" corridors) is not included in ASF. ASF does not include the thickness of any walls.

3. NET ASSIGNABLE SQUARE FEET (NASF) continued.....

Examples of Included Spaces:

- Reception
- Interior circulation corridor serving suite
- Phantom corridor for large unpartitioned space
- Office
- Workroom/Copy room
- Conference or seminar room
- File room or storage room
- Teaching or Research Laboratory
- Teaching or Research laboratory support space
- Classroom and classroom support space
- Library and library support space
- Special purpose rm .(e.g., auditoria, cafeteria, TV studio)
- Locker or shower room
- Maintenance garage
- Private restroom
-

Special Examples of Included Spaces:

- Capital Projects & Facilities Management Department offices, locker rooms, storage areas, shops, etc., located in Campus buildings, which are generally usable by other activities. Include separate central heating, cooling, or generating plant buildings.
- Separate mechanical service or equipment areas within buildings supporting or serving specific laboratories or program activities generally classified as laboratory service.
- Loading docks within the environmentally-controlled envelope of a building directly assignable to a specific department or program within the building. Exception: Loading docks serving multiple departments or programs are counted as circulation and are nonassignable.
- Phantom corridors within departmental suites.
- Lobbies which are internal corridors serving operational functions (e.g., reception areas, waiting areas, areas serving display cases).
- Library stack areas, including aisles, stairwells, elevators, and book lifts within book stacks.
- Library reading rooms, including aisles.
- Restrooms for:
 - Residence hall and apartment occupants.
 - Hospital inpatients receiving treatment or diagnostic-related services.
 - Clinic outpatients receiving treatment or diagnostic-related services.
 - Executive suites.
 - Instructional and research activities dedicated solely to a department (e.g., nonpublic).

- D. **Limitations.** Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas defined as building service, circulation, mechanical, and structural should not be included.

4. NONASSIGNABLE SQUARE FEET

- A. **Definition.** The sum of all areas on all floors of a building not available for assignment to an occupant or for specific use, but necessary for the general operation of a building.
- B. **Basis for Measurement.** Nonassignable Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than 3-foot clear ceiling height unless the criteria of a separate structure are met.

Measured in terms of Nonassignable Square Feet,

*Nonassignable Square Feet = Sum of the Areas Designated as the
Three Nonassignable Space Use Categories*

- C. **Description.** Included should be space subdivisions of the three nonassignable space use categories of
- (1) Building Service Area
 - (2) Circulation Area
 - (3) Mechanical Area
- which are used to support the building's general operation. This space is all space which is not considered NASF. Nonassignable square feet does not include the thickness of walls.

Examples of Included Spaces:

(1) *Building Service Area*

- Custodial supply closets
- Custodial room
- Other specialized custodial facilities which are usable only for building maintenance
- Public restrooms and restroom support space
- Building trash room

(2) *Circulation Area*

- Bridge (if covered)/Tunnel
- Elevator and dumbwaiter
- Loading dock and enclosed driveways
- Public Lobby
- Public and shared-use circulation corridor
- Public stairway and stairwell

(3) *Mechanical Area*

- Mechanical room
- Electrical room
- All areas in central plant buildings devoted to mechanical services or equipment, either for the building itself or for services to other buildings
- Telephone and data network closets
- Shaft space

- D. **Limitations.** Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas defined as assignable should not be included.

4.1 Building Service Area

-See Figure 3.1 for graphical depiction (page 11)

- A. **Definition.** Nonassignable spaces used to support a building's cleaning and public hygiene functions. The sum of all areas on all floors of a building used for custodial supplies, custodial sinks rooms, custodial closets and public restrooms.
- B. **Basis for Measurement.** Building Services Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form boundaries of the designated areas. Exclude areas having less than 3-foot clear ceiling height unless the criteria of a separate structure are met.
- C. **Description.** Included should be janitor closets or similarly small custodial spaces, maintenance material storage areas, trash rooms exclusively devoted to the storage of nonhazardous waste created by the building occupants as a whole, and public restrooms.
- D. **Limitations.** Deductions should not be made for necessary building columns and minor projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Assignable areas classified as Shop, Central Storage, Central Supplies, or special purpose storage or maintenance rooms such as linen closets and housekeeping rooms in the residence halls should not be included. Do not include private restrooms that should be classified as assignable space as Office Service.

4.2 Circulation Area

-See Figure 3.2 for graphical depiction (Page 12)

- A. **Definition.** The sum of all areas on all floors of a building required for physical access to floors or some subdivisions of space within the building, whether directly bounded by partitions or not.
- B. **Basis for Measurement.** Circulation Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form boundaries of the designated areas. Exclude areas having less than 3-foot clear ceiling height unless the criteria of a separate structure are met.
- C. **Description.** Included should be fire towers, elevator lobbies, tunnels, bridges, and each floor's footprint of elevator shafts, escalators, and stairways. Also included are public corridors or walkways, whether walled or not, provided they are either within the outside face lines of the buildings to the extent of the roof drip line or, if covered, to the extent of their cover's drip line. Receiving areas, such as loading docks, should be treated as circulation space. Any part of a loading dock that is not covered is to be excluded from both Circulation Area and Gross Area.
- D. **Limitations.** Deductions should not be made for necessary building columns and minor projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. When determining corridor areas, only spaces required for public access should be included. Restricted access private circulation aisles used only for circulation within an organizational unit's suite of rooms, auditoria, or other working areas should not be included. A loading dock, or portions thereof, that are also used for central storage should be regarded as assignable area and coded as Central Storage.

4.3 Mechanical Area

-See Figure 3.3 for graphical depiction (page 13)

- A. **Definition.** The sum of all areas on all floors of a building designed to house mechanical equipment, utility services, and shaft areas.
- B. **Basis for Measurement.** Mechanical Area is computed by physically measuring or scaling measurements from the inside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than a 3-foot ceiling height unless the criteria of a separate structure are met.
- C. **Description.** Included should be mechanical areas such as central utility plants, boiler rooms, mechanical and electrical equipment rooms, fuel rooms, meter and telecommunications closets, and each floor's footprint of air ducts, pipe shafts, mechanical service shafts, service chutes, and stacks.
- D. **Limitations.** Deductions should not be made for necessary building columns and projections. These small areas are excluded as they represent an insignificant percentage of the total area of an average-sized space. Capturing their area would be unduly burdensome relative to the very small contribution they would make toward precision. Areas designated as public toilets are not included in this category but are included under Building Service Area.

5. STRUCTURAL SQUARE FEET

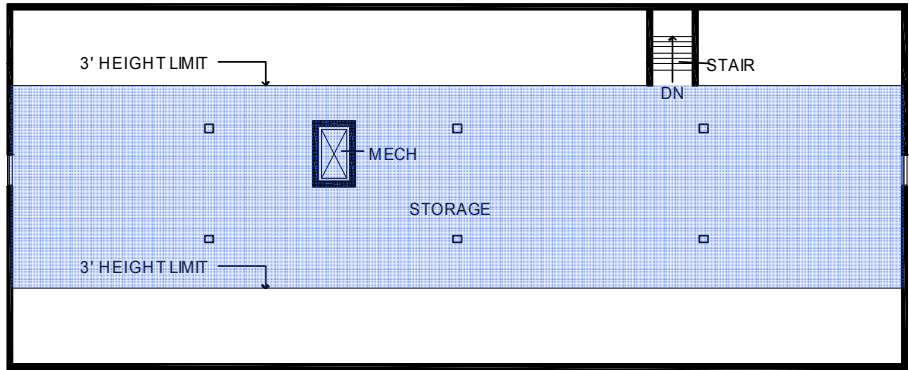
- A. **Definition.** The remaining area within the gross square footage of a building is structural or "construction" square feet, which cannot be occupied or put to use. This is defined as the sum of all areas on all floors that cannot be occupied or put to use because of structural building features. This is the mathematical difference between Gross Square Feet and Net Usable Square Feet. Examples of building features normally classified as structural areas include exterior walls, fire walls, permanent partitions, unusable area in attics or basements, or comparable portions of a building with ceiling height restrictions, as well as unexcavated basement areas.
- B. **Basis for Measurement.** Precise computation by direct measurement is not possible under this definition. Structural Square Feet is determined by calculating the difference between the measured gross square feet and the measured net usable square feet.

Measured in terms Structural Square Feet,

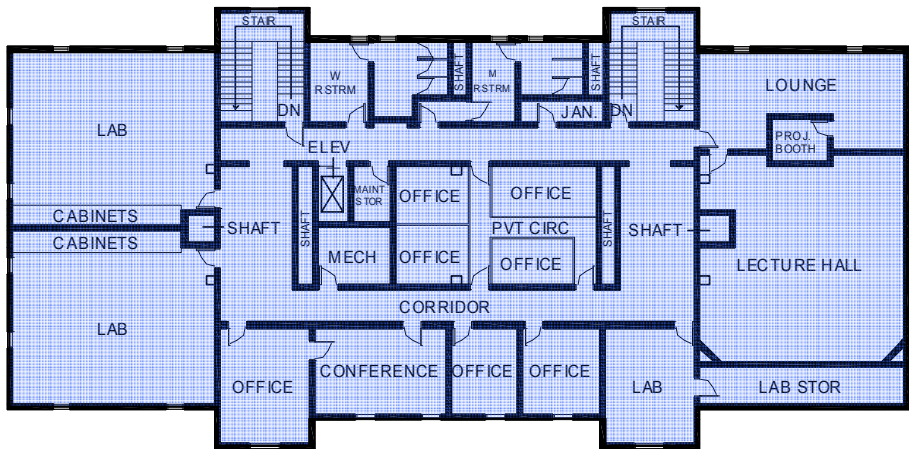
$$\text{Structural Square Feet} = \text{Gross Square Feet} - \text{Net Usable Square Feet}$$

- C. **Description.** Examples of building features normally classified as structural areas include exterior walls, fire walls, permanent partitions, usable areas in attics or basements, or comparable portions of a building with ceiling height restrictions.
- D. **Limitations.** This area is not measurable but can be calculated by Structural Square Feet formula above.

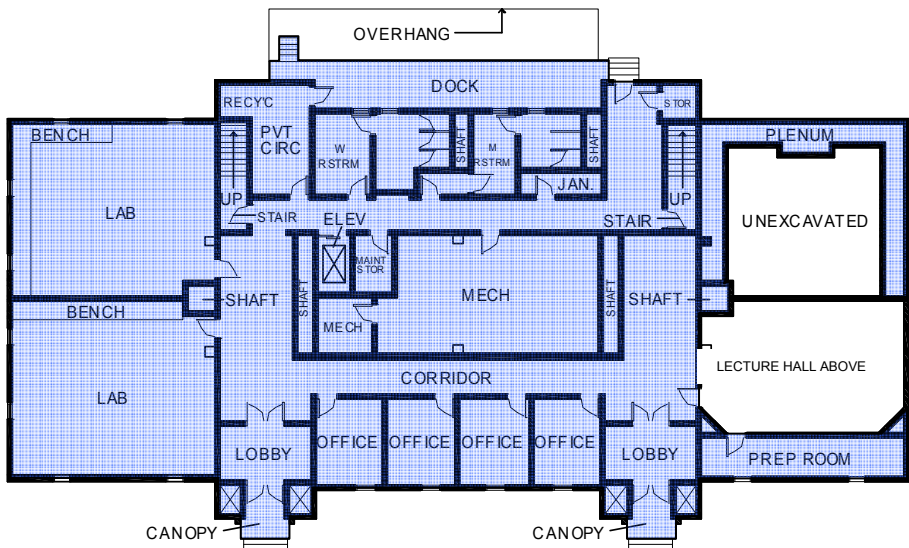
Figure 1: Gross Square Feet (GSF) of a building by floor



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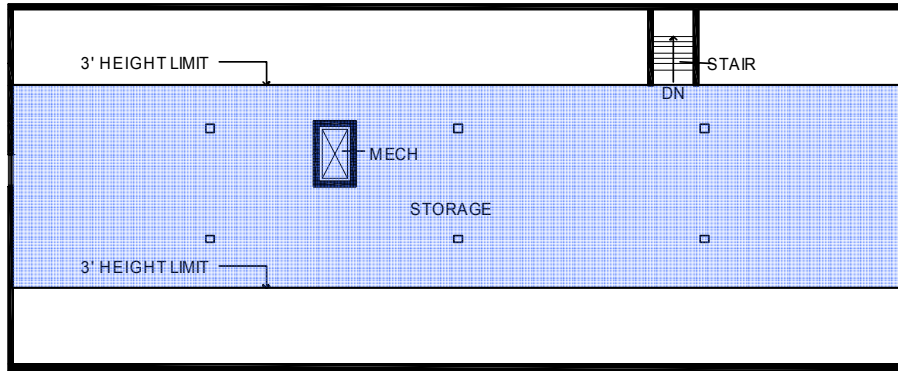
SECOND FLOOR



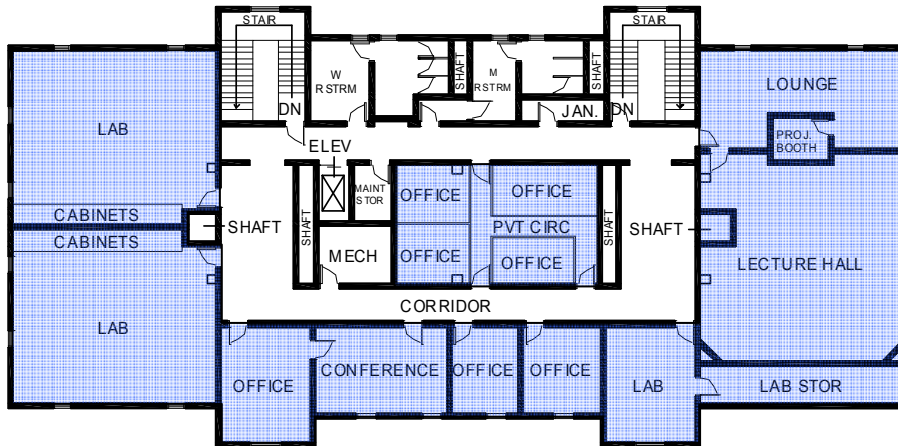
GROUND FLOOR

COURTESY OF INSITE

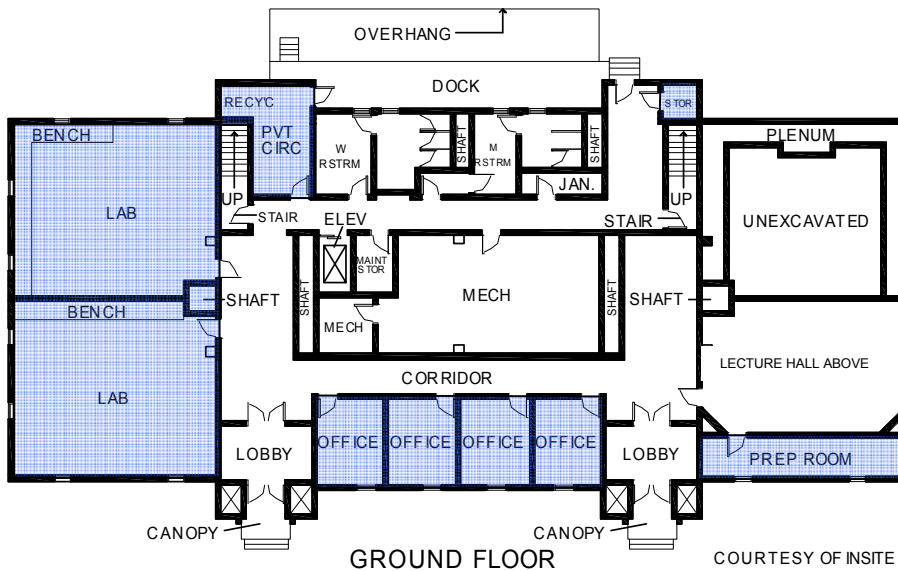
Figure 2: Net Assignable Square Feet (NASF) of a building by floor



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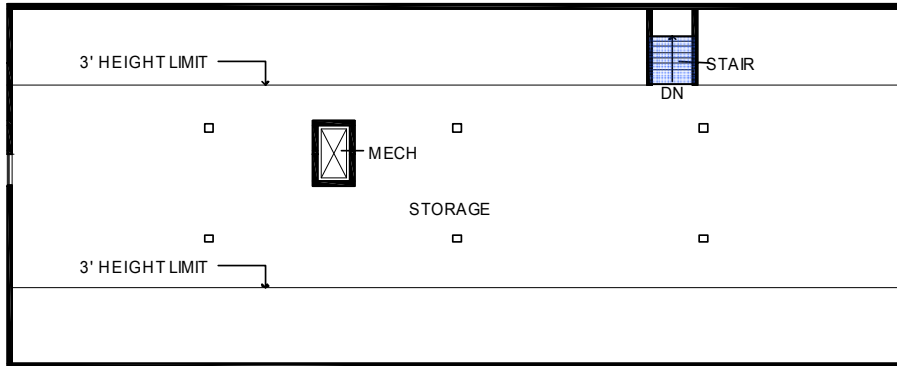
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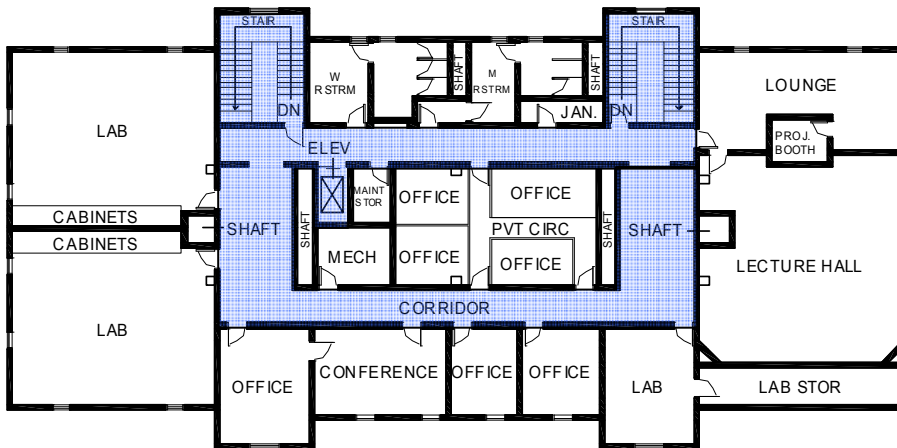
GROUND FLOOR

COURTESY OF INSITE

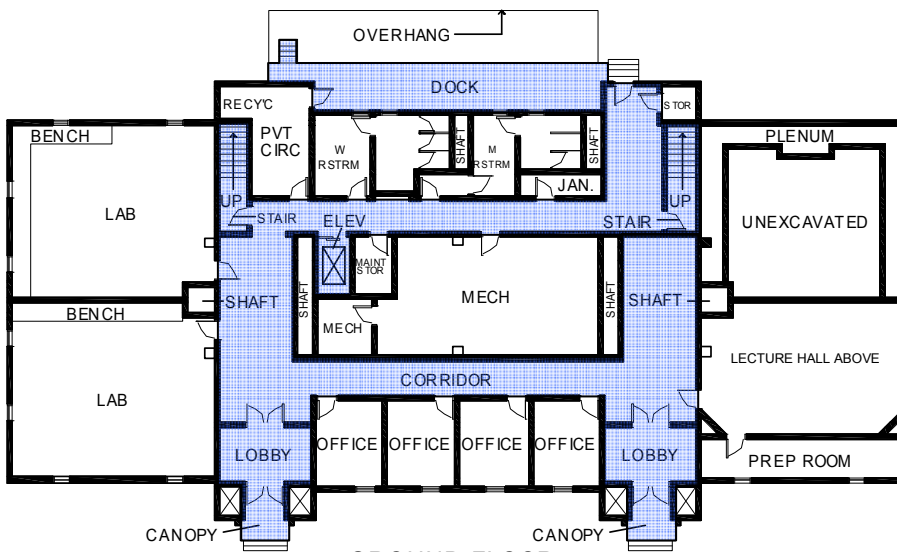
Figure 3.2: Circulation Area of a building by floor



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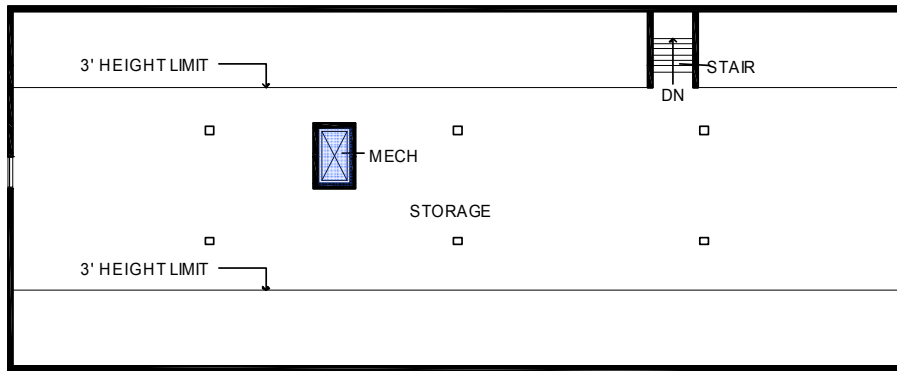
SECOND FLOOR



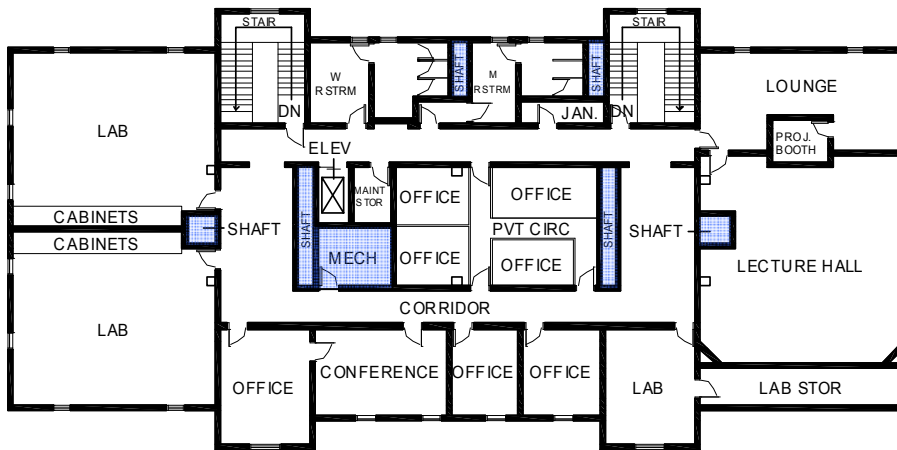
GROUND FLOOR

COURTESY OF INSITE

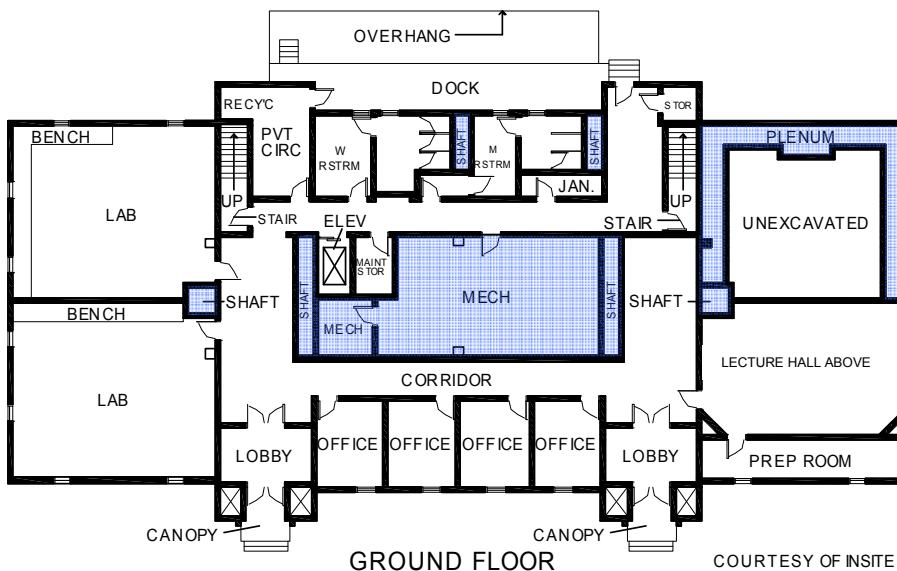
Figure 3.3: Mechanical Area of a building by floor



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SECOND FLOOR



GROUND FLOOR

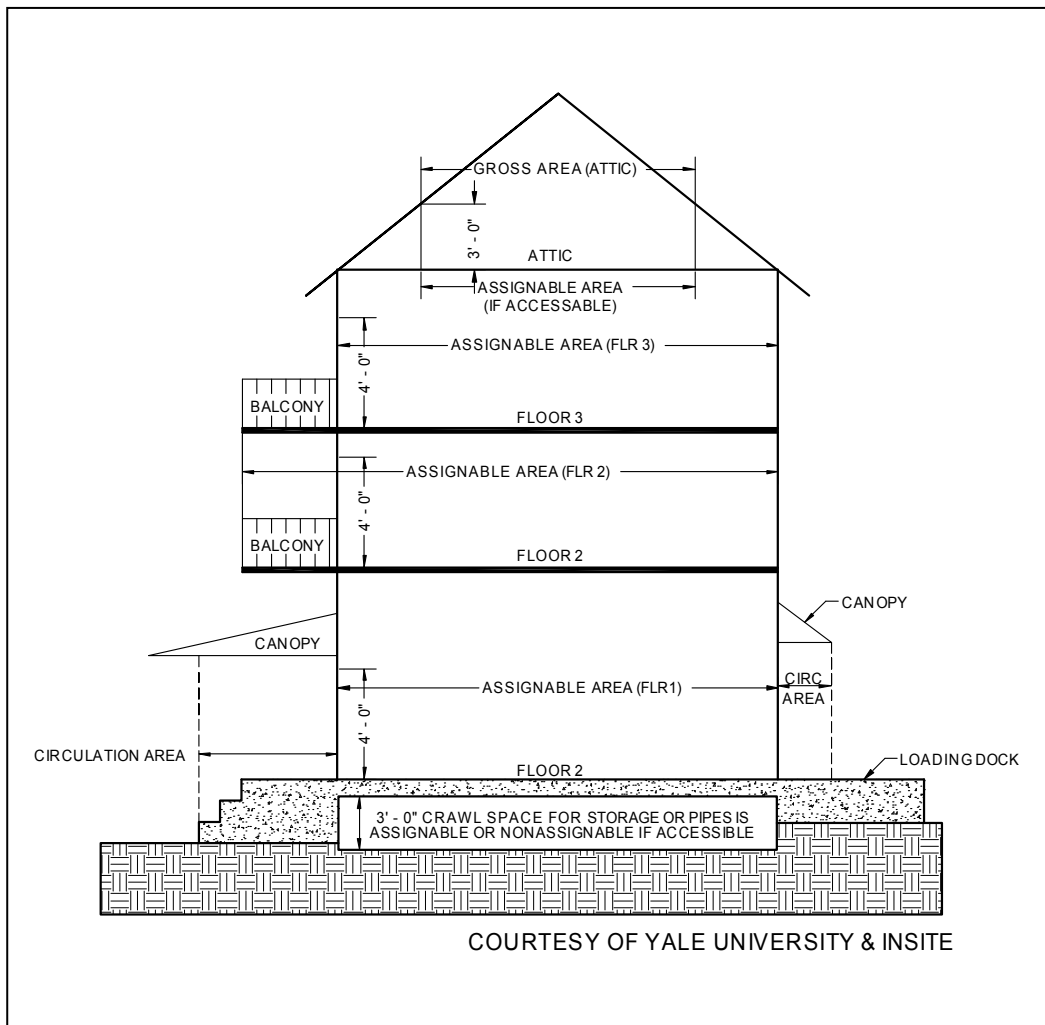
COURTESY OF INSITE

6. ILLUSTRATIVE CROSS-SECTION OF A BUILDING

-See Figure 4 for graphical depiction

The diagrammatic cross-section of a building (Figure 5) has been included to better illustrate the area measurement descriptions for less common situations such as exterior balconies, overhung egress area and loading docks, and 3-foot ceiling height rule for including floor areas.

Figure 4: Illustrative cross-section of a building



II. WSU STAIRWAYS & STAIRWELLS MEASUREMENT

Definition:

The covered internal or external space dedicated to provide non-mechanically assisted passage from one floor level to another. In an enclosed stairway, the cross-sectional area of the stairwell is inventoried at each floor through which it passes. In an unenclosed stairway, only that area beneath the stairway structure that is not accessible or has less than a 3-foot ceiling height is included.

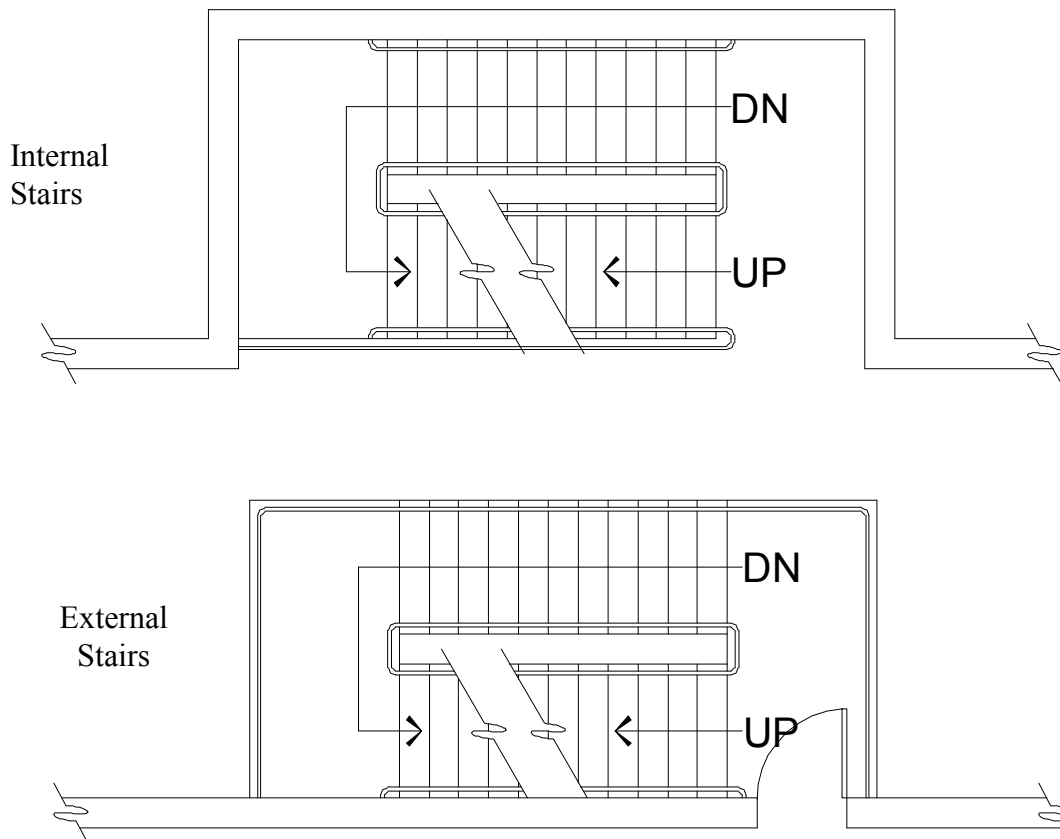
Limitations:

In stairways that pass through floor openings larger than themselves, the open area around the stairway's floor penetration is not counted as either gross area or usable area. In an unenclosed stairway, that area beneath the stairway structure that is accessible and has a 3-foot ceiling height or greater should be included as both gross area and usable area in the inventory.

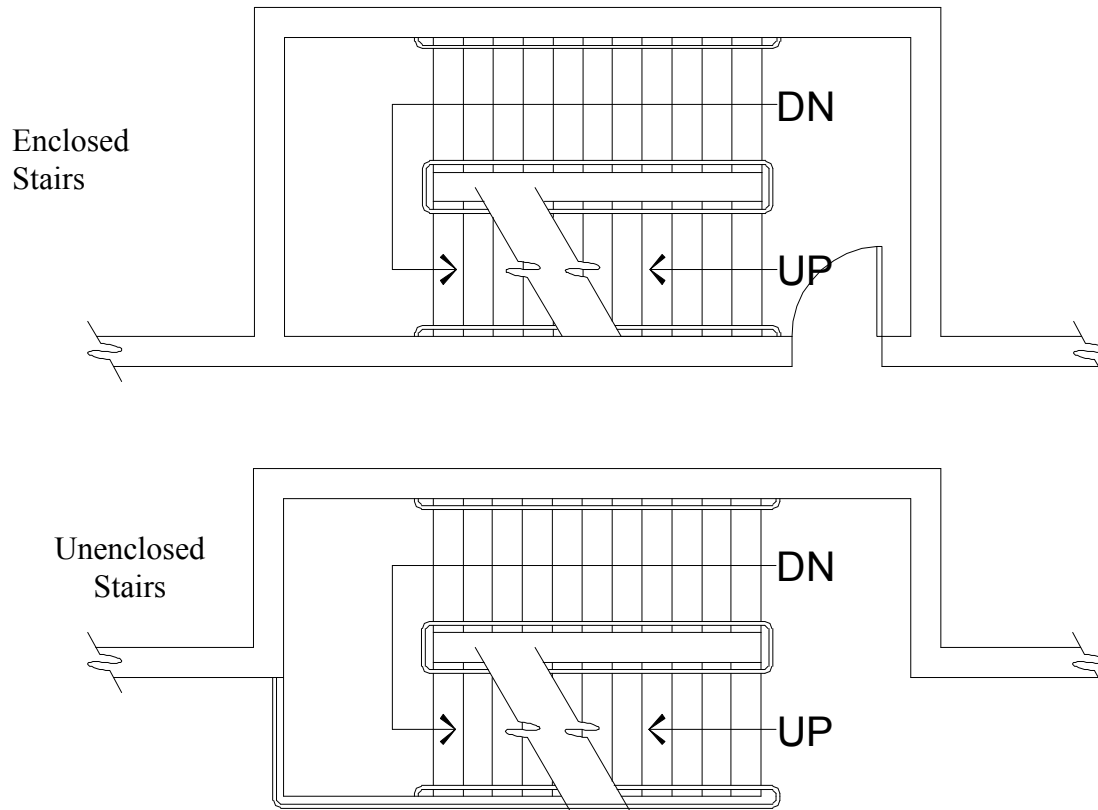
Explanation:

There are a few distinctions that FICM makes in understanding area calculations pertaining to stairways.

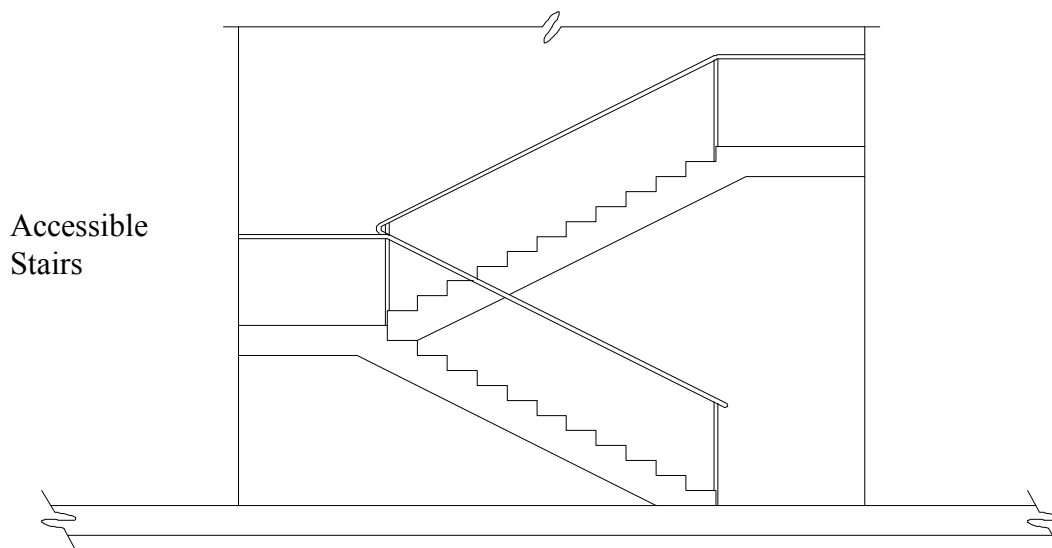
1. Internal vs External

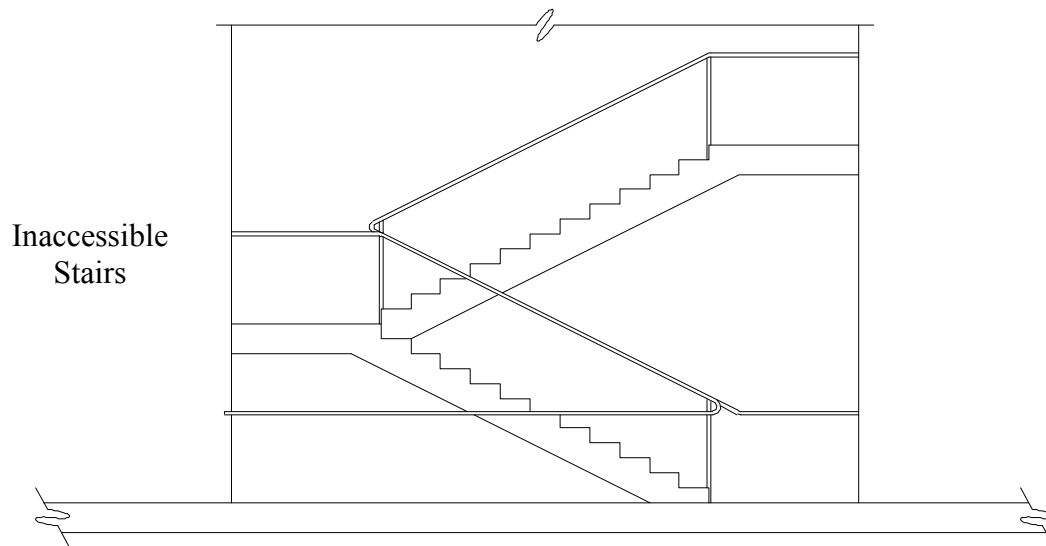


2. Enclosed vs Unenclosed



3. Accessible vs Inaccessible





Stairways must be covered to be included in the gross area of the buildings. Coverings must be intended for the purpose of covering the stairways. Roof overhangs do not count unless specifically designed to double as stairway cover.

FICM attempts to distinguish between enclosed and unenclosed stairways. Enclosed stairways are those considered to be stairwells which are enclosed on all sides by walls whereas unenclosed stairways are open to other rooms. FICM recognizes a difference in area calculations between these two types of stairways. This explanation serves to recognize the difference FICM puts forth however treats both enclosed and unenclosed stairways the same in light of area calculations.

Due to possible conflicts in classifying stairways as either enclosed or unenclosed a more clear distinction is made which eliminates the need for the distinction of enclosed versus unenclosed stairways. Thus the definition put forth by FICM is not neglected but rather further refined.

Enclosed vs Unenclosed is redefined to read:

Area Serving Stairway Circulation vs Area Serving Mere Architectural Aesthetics.

Only those areas which serve the circulation activity of the stairways shall be included in area calculations. Though considered part of stairways, spaces that are merely architectural are excluded from area calculations. Defined stairway landings are also included in the area calculations of stairways because landings serve the circulation of stairways.

Only those spaces considered inaccessible to the floor space beneath stairways shall be included in the area calculations of stairways. FICM defines area beneath stairways having less than 3-foot clearance to be inaccessible to the floor space below. Such area belongs to stairways in area calculations. Any accessible spaces underneath stairways are subtracted from the area calculations of stairways.

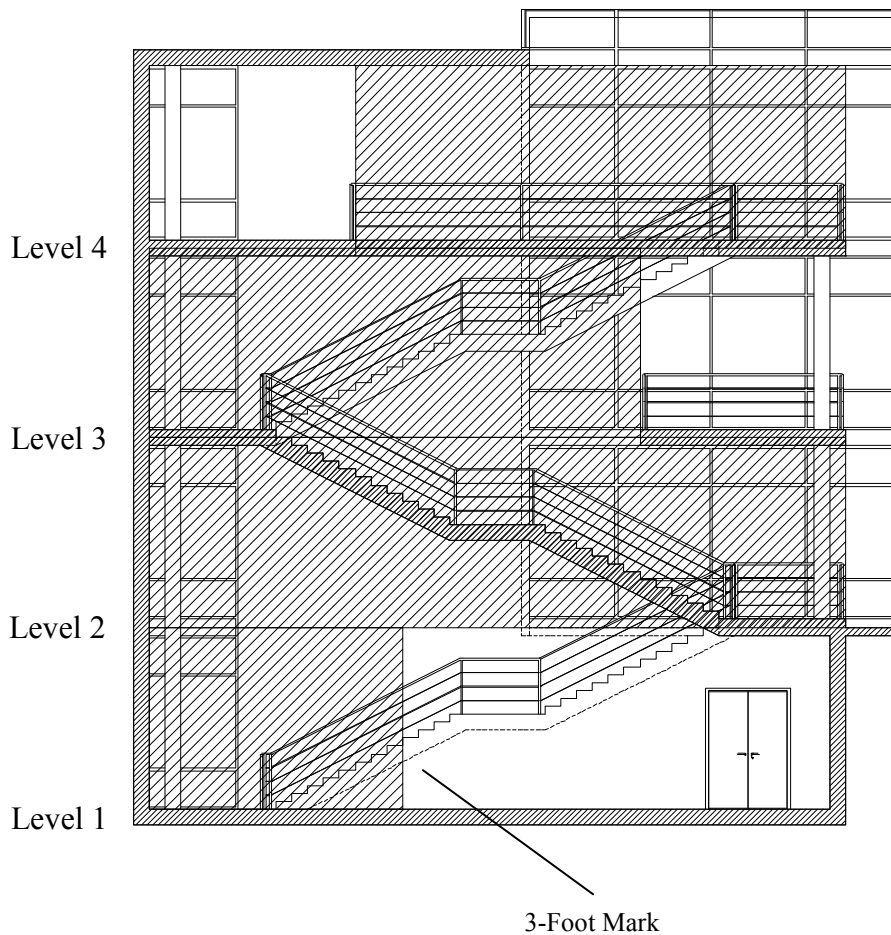
Examples of accessible area underneath stairways:

- Closets
- Spaces open to activity with 3-foot clearance or greater

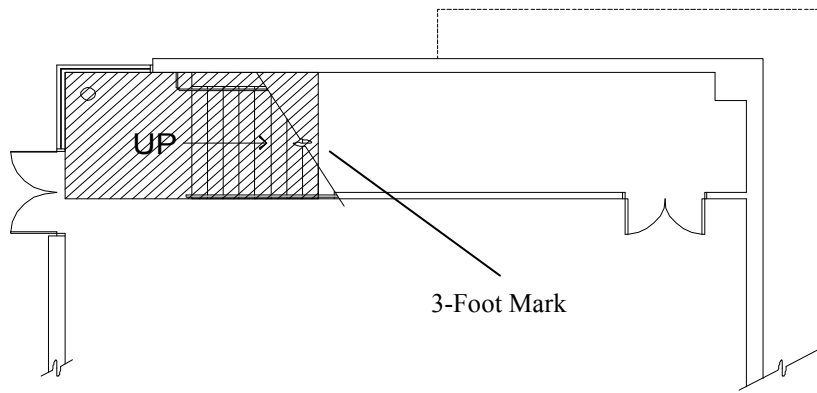
Examples of inaccessible area underneath stairways:

- Spaces closed off by railings
- Planter boxes
- Solid fill materials such as concrete or unexcavated earth
- Spaces closed off by walls with no access

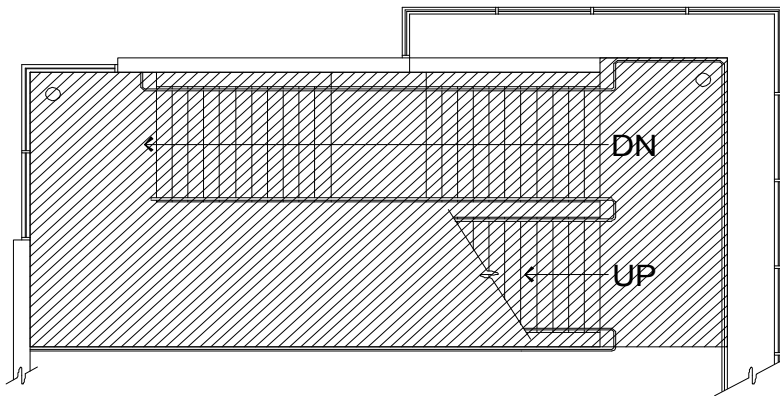
Below is an example of a stairway and area calculations pertaining to it according to the standard listed above. Areas belonging to the staircase are hatched. Illustrated are four floor plans following a section cut of the example stairway.



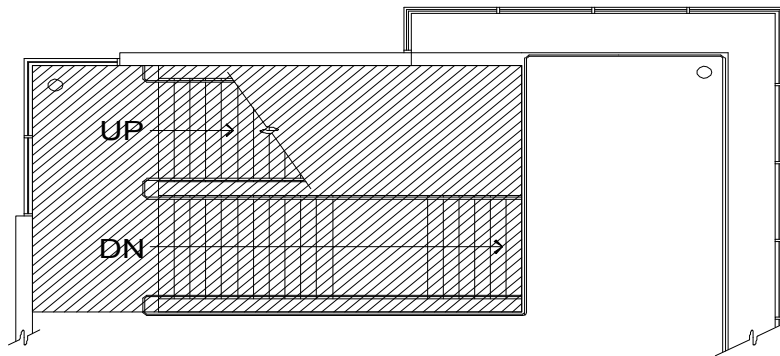
Level 1



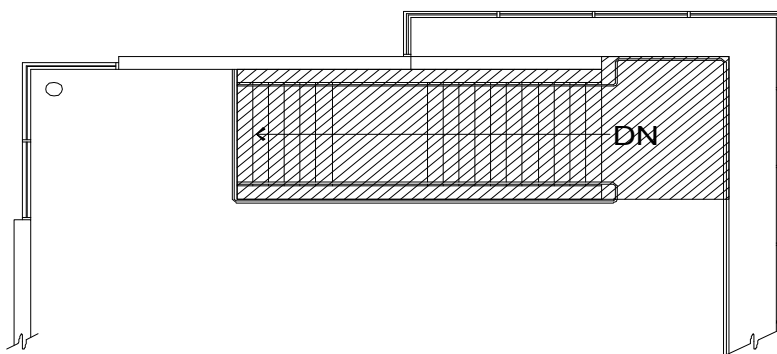
Level 2



Level 3



Level 4



III. BUILDING AREA MEASUREMENT: QUESTIONS AND ANSWERS

1. Question: How should I report an area that is covered, but not enclosed, on all four sides?

Answer: Areas that are permanently covered but not enclosed should be inventoried as assignable or nonassignable space depending upon the space use. Bounding the area with “phantom walls” along the drip line of the “cover” defines the area to be measured and added to the building’s gross area as well as to the assignable or nonassignable area, depending upon the use of the space. A space use, whether floored or not, that exists beyond the drip line of the covered area is not reported. Alternately, the area beneath a permanent cover that extends beyond a floored area is also not reported.

2. Question: There is a permanent eating area, equipped with tables and chairs, which is located in a covered, unenclosed area of our Student Union Building. Is this space assignable even though the facility only has one wall? Should I count this space as part of the gross area?

Answer: By creating “phantom walls,” you would classify this assignable area as Food Facility (630). This area should also be reported as part of the building’s gross area.

3. Question: Should I inventory underground pedestrian tunnels and above-ground pedestrian bridges that connect buildings?

Answer: They should be included as both gross area in your inventory and as nonassignable circulation area.

4. Question: On our campus, we have “buildings” that are really contiguous structures built at different times to meet new needs. For example, a library wing was added to a classroom structure, and later a structure housing laboratories was added. However, they all share walls and are physically connected. Should these be inventoried as a single structure or several different buildings?

Answer: It is preferable to treat each addition/wing as a separate structure, depending upon factors such as the source of the funds; the separation of each structure’s mechanical, electrical, or plumbing systems; the age differences of the two joined facilities, etc. If treated as separate structures, commonly shared walls would be prorated one-half with each of the respective facilities.

5. Question: We have several houses that were converted into administrative offices. The uppermost usable floor has a vaulted ceiling. The floor to ceiling distance is 4’0” around the perimeter of the exterior rooms. Should the area be calculated from the edge of the kneewall? The ceiling height in the attic is 5’0” and contains HVAC equipment. Should this space be considered a Building Service area?

Answer: The area on the uppermost usable floor with a vaulted ceiling should be included in that floor’s gross area. Since assignable area includes any interior space having 3’0” or more of ceiling height, in your case, the assignable area would be measured from the smallest floor to ceiling distance—the 4’0” kneewall of the space. Attic space used for administrative offices should be categorized as Office (310). Attic space containing HVAC equipment should be designated as nonassignable Utility/Mechanical Space (Y04).