

Appendix C. Building Area Overview

Within the context of the Corporate Equipment and Facilities System, information on buildings is developed to provide a database of building physical and functional characteristics and measurements. Appendix C is intended to provide the definitional and procedural framework within which building areas of various kinds are to be calculated and descriptive information is to be recorded so that building data can be accumulated and reported for basic space inventory and analysis purposes.

In addition to building area measurements which are required input (e.g., basic gross area, covered unenclosed gross area) to the corporate facilities building file, several other building area measurements (e.g., mechanical area, custodial area) are described and recommended for maintenance in campus records in order to permit a systematic determination and reporting of the required data elements and to provide a more comprehensive and uniform database of overall building area measurements.

Definition of "Building"

A "building" is defined as a roofed structure for permanent or temporary shelter of persons, animals, plants, materials, or equipment. The building inventory may encompass many different types of structures, including marine and space structures (e.g., satellites, whether staffed or not); research vessels; aquarium structures; and trailers that are not on wheels and are used for offices, research, residences, storage, etc.

Buildings to be Included

The inventory should include buildings that are under the jurisdiction or control of the institution's governing board, regardless of their location. (See next section for buildings to be excluded.) Where the institution occupies space in buildings not owned by the institution or that is shared with other tenants, include in the inventory only that portion of the building leased or controlled by the institution and its prorata share of gross, assignable area and nonassignable area (see definitions below).

Institutions will normally exclude various minor structures from their inventory based on various criteria (e.g., insignificant size, unusable condition). Separate, minor structures should be included in the inventory if *all* of the following criteria are met:

1. They are attached to a foundation;
2. They are roofed;
3. They are serviced by a utility, exclusive of lighting; and,
4. They are a source of significant maintenance and repair activities.

Following these guidelines, an example of a minor structure to be included in a building inventory is a traffic control or information booth, roofed, attached to a concrete pad, with lights and at least one other utility service (e.g., electrical outlet for heater or computer, telecommunications service), and on a regular maintenance schedule. An example of a separate structure not meeting the above criteria is a bus shelter, roofed, and attached to the concrete sidewalk, but with only lights.

Institutions may choose to include certain separate, minor structures that do not meet all of the above criteria in their inventories because of requirements to manage and maintain such facilities. (An example

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would be a covered, unenclosed field building which is used as a hay shed.) The inclusion of such facilities permits the space to be assignable to specific functions, disciplines, and organizational units. (See also *Building Measurement Terms and Definitions* in this appendix.)

Buildings to be Excluded

The following types of buildings are excluded from the inventory:

1. Regents' assets (e.g., property holdings used as investments);
2. Hospitals not owned by the institution, except for any space in the hospital leased or controlled by the institution;
3. Public schools not owned by the institution, but used for practice teaching;
4. Federal contract research centers (e.g., Livermore Lab);
5. Overseas campuses;
6. Facilities on wheels (e.g., mobile clinics). "Fixed" mobile facilities, however, are reportable (e.g., relocatable buildings, "mobile homes" on blocks);
7. Marine vessels (Exception: Marine vessels are included in the building file with '1' Basic Gross Square Foot when required to account for equipment assigned to them.)

Other Plant Assets

For management purposes, institutions are encouraged to inventory all physical plant assets, including infrastructure components, in the Plant Asset file, which is broader in scope than the facilities inventory database. Examples include utility distribution systems (e.g., heating, cooling, power, water, wells and waste disposal) and support facilities which provide access or safety related services (e.g., roads, campus lighting).

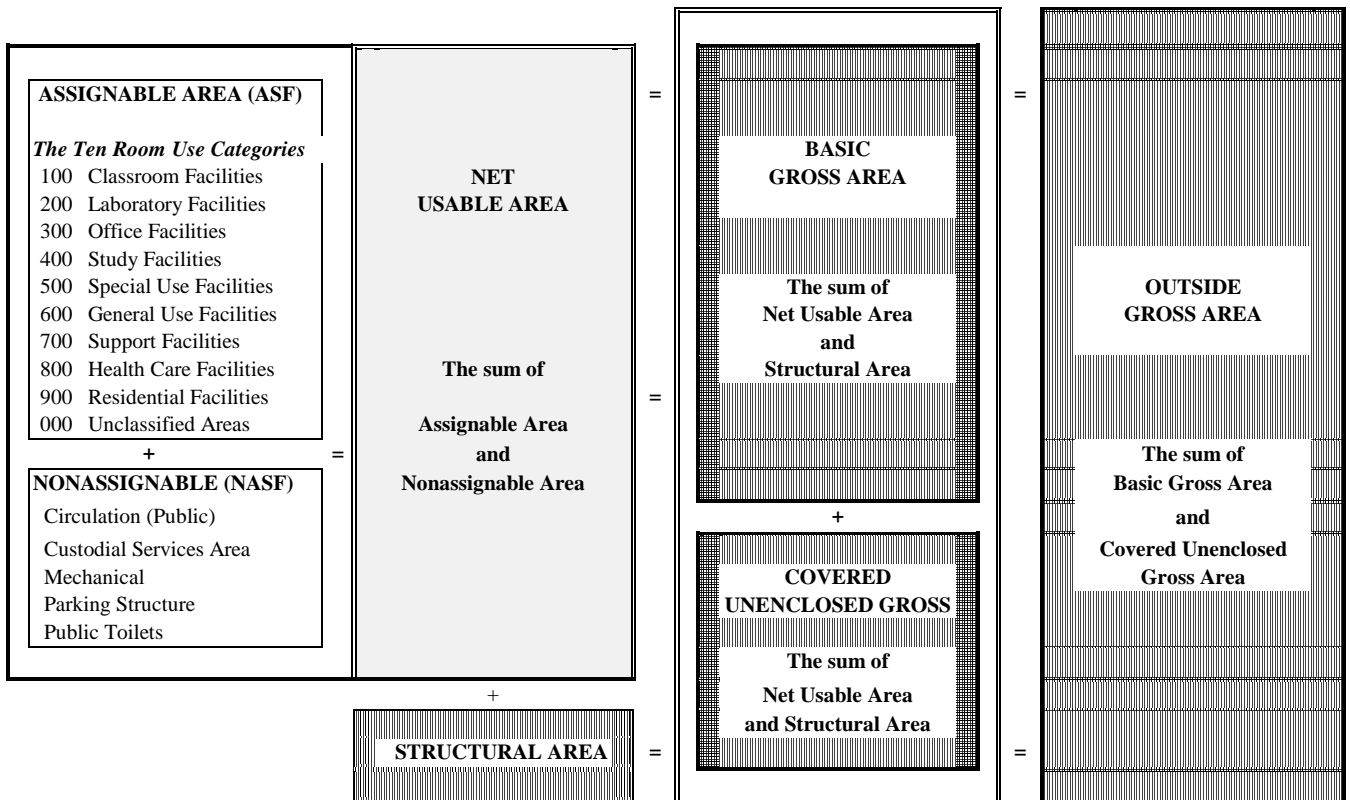
Degree of Accuracy Conventions

The following degree-of-accuracy conventions apply to all facilities area computations:

Area of Dimension	10 feet 7-1/4 inches by 32 feet 7-1/2 inches
Round to	10 feet 7 inches by 32 feet 8 inches
Computed square feet	10.58 feet x 32.67 feet = 345.65 feet
Reportable square feet	346 feet

Building Measurement Terms and Definitions

In a building inventory, it is important to be able to determine the amount of space that can be assigned to people or programs (i.e., assignable area). However, buildings necessarily contain other types of space as well (e.g., nonassignable area, structural area). The sum of assignable area, nonassignable area, and structural area, plus any covered unenclosed area, equals a building's outside gross area. The relationships between these types of space are illustrated below and defined in the following pages.



Below are required building-related data elements that are required input to the Corporate Equipment and Facilities (CEFA) System.

Assignable Area

Nonassignable Area
 mechanical and private

Custodial Services Area

Public Toilet Area

Nonassignable Area is the sum of custodial, public toilet, circulation, vehicle parking (structure) areas.

Not a corporate requirement but required as part of Janitorized Area; campuses should maintain data locally.

Not a corporate requirement but required as part of Janitorized Area; campuses should maintain data

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Circulation Area	locally. Not a corporate requirement but required as part of Janitorized Area; campuses should maintain data locally.
Mechanical Area	Not a corporate requirement but required as part of Janitorized Area; campuses should maintain data locally.
Private Vehicle Parking Area	Not a corporate requirement but is required as part of Unrelated Gross Area; campuses should maintain data locally.
<p>Net Usable Area Not a corporate requirement. <i>Net Usable Area</i> is the sum of Assignable and Nonassignable Areas.</p>	
<p>Structural Area Not a corporate requirement. <i>Structural Area</i> is Basic Gross Area less Net Usable Area. Structural Area is also known as Construction Area.</p>	
<p>Basic Gross Area Required corporate building file data element. <i>Basic Gross Area</i> is the sum of Assignable, Nonassignable, and Structural Areas.</p>	
Covered Unenclosed Gross Area	Required corporate building file data element.
Outside Gross Area	Not a corporate requirement; the system calculates Outside Gross Area using campus-supplied Basic Gross and Covered Unenclosed Gross data.
Nonassignable Parking Structure Area	Required corporate building file data element and is used for calculation of Maintained Area. <i>Nonassignable Parking Structure Area</i> is the sum of Private Vehicle Parking Area plus its prorated share of Structural Area.

Although not all the data elements defined in this appendix are required corporate data elements, these definitions are included to clarify and provide guidelines for the most commonly used types of data collected and compiled on buildings. These guidelines are intended to establish a common standard for the recommended minimum amount of data to be included in a campus building inventory in order to provide a database that is usable for both intra-institutional and inter-institutional purposes. These guidelines do not preclude local campus collection of additional building data or inclusion of other types of structures in the facilities inventory.

Assignable Area

Definition: The sum of all floor or surface areas of a building assigned to, or available for assignment

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to, an occupant or user, including every type of space functionally usable by an occupant or user.

Description: The amount of space that can be used for programs (functions) or assigned to occupants is known as the *Assignable Area*. The Assignable Area of a room is the area measured within the interior walls of the room. Included are the space subdivisions of the ten major room use categories for assignable space that are used to accomplish the institution's mission: classrooms, laboratories, office facilities, study facilities, special use facilities, general use facilities, support facilities, health care facilities, residential facilities, and unclassified areas. See Appendix B, *Room Use Codes and Definitions*, for room code values and definitions; Appendix C, *Building Area Overview*, for discussion of the relationship between assignable and other building areas; and Appendix D, *Definitions Checklist*, for specific and unusual situations.

Measured in terms of assignable square feet (ASF),

$$\text{Total Assignable Area} = \text{Sum of the Ten Room Use Categories of Assignable Space}$$

Basis for Measurement: Assignable 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 six-foot, six-inch (6'6") clear ceiling height unless the criteria of a separate structure are met (refer to the section on *Buildings to be Included*, page C.1.) (See architectural drawing of Assignable Area on next page.)

Exclusions: Deductions should not be made for necessary free-standing columns or architectural and structural projections. Areas defined as custodial, public toilet, circulation, and mechanical are excluded.

Nonassignable Area

There are various kinds of areas within a building that are essential but which are not assigned directly to support programs: Custodial Services Area, Public (General Access) Toilet Area, Circulation (Public) Area, Mechanical Area, and Parking Structure Area. These five building area measurements, which are required corporate facilities system input specifications, constitute *Nonassignable Area*.

Nonassignable area is defined as the sum of all areas on all floors of a building not available for assignment to an occupant or specific use, but necessary for the general operation of a building.

Measured in terms of nonassignable square feet,

$$\text{Nonassignable Area} = \text{Custodial} + \text{Public Toilet} + \text{Circulation} + \text{Mechanical} + \text{Parking Structure}$$

Nonassignable: Custodial Services Area

Definition: The sum of all areas on all floors (that portion of the basic gross and covered unenclosed gross area) of a building used for building protection, care, maintenance, and operation.

Description: Includes janitor closets or similarly small cleanup spaces, interior incinerator rooms, custodial toilets, maintenance material storage areas, trashrooms exclusively devoted to the storage of non-hazardous waste created by the building occupants as a whole, and other specialized custodial facilities which are usable only for building maintenance.

Basis for Measurement: Custodial Services Area is computed by measuring from the *inside* face of walls

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and partitions. (See architectural drawing of Custodial Services and Public Toilet areas on next page.)

Exclusions: Deductions should not be made for necessary building columns and minor projections. Areas defined as central physical plant shops, custodial offices or locker rooms, interior loading and receiving docks, special purpose storage or maintenance rooms (e.g., linen closets and housekeeping rooms in residence halls), and private rest rooms are considered assignable areas and therefore should not be included.

Note: For reconciliation purposes, campuses are advised to track and maintain separate records for Custodial Areas which exist in typical buildings having Basic Gross areas and in covered unenclosed facilities.

Nonassignable: Public Toilet Area

Definition: That portion of basic gross area devoted to nonassignable public or general access toilet facilities.

Description: Includes public or general access toilet rooms, including cot rooms and vestibules.

Basis for Measurement: Public toilet area is computed by measuring from the *inside* face of walls and partitions which enclose such areas. (See architectural drawing of Custodial Services and Public Toilet areas on next page.)

Exclusions: Private and custodial toilet rooms. Private toilet rooms include rest room areas for residence hall and apartment occupants, clinic outpatients, hospital inpatients, executive suites, instructional and research activities (e.g., controlled environment laboratories and gymnasias), washrooms and showers for academic activities or performers, etc.

Nonassignable: Circulation Area

Definition: The sum of all areas on all floors (that portion of the basic gross and covered unenclosed gross area) of a building, both within and without the environmentally controlled envelope, which is required for physical access to some subdivision of space, whether physically bounded by partitions or not, *exclusive* of private vehicle parking areas.

Description: Included should be, but is not limited to, corridors (access: public, private, and service), elevator shafts, escalators, stairs, stair halls, fire and smoke towers, lobbies for general circulation (e.g., public, entrance, elevator) that do not serve operational functions such as reception and waiting, public vestibules, pedestrian tunnels and bridges, and loading platforms or docks within the environmentally controlled envelope serving various departments within the building (except when required for operational reasons and thus, included in assignable area). Any part of a loading dock that is not covered is to be excluded from both circulation area and the gross building area. A covered unenclosed loading dock which is also used for central storage should be regarded as assignable area and coded as 720-central storage.

Basis for Measurement: Circulation area is computed by physically measuring or scaling measurements from the *inside* faces of walls or partitions which enclose horizontal spaces used for circulation; or, when such spaces are not enclosed by walls or partitions, measurements shall be taken from imaginary lines which conform as nearly as possible to the established circulation pattern of the building. Vertical circulation space shall be counted at each floor. Within an assignable facility (e.g., library), allow 6'0" strip for circulation in front of public-use facilities such as elevators and public toilets. (See architectural drawing of Circulation Area on next page.)

Exclusions: Deductions should not be made for necessary building columns and minor projections. 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; uncovered circulation areas at grade; and uncovered unenclosed that are paved should not be included. *Private vehicle storage, circulation and access areas are also excluded (see definition of Private Vehicle Parking Area on page C.XX).*

Note: For reconciliation purposes, campuses are advised to track and maintain separate records for Circulation Areas which exist in typical buildings having Basic Gross areas and in covered unenclosed facilities.

Nonassignable: Mechanical Area

Definition: The sum of all areas on all floors (that portion of basic gross and covered unenclosed gross area) of a building which houses the mechanical equipment, utility services, and shaft areas for the building.

Description: Included are mechanical areas such as central utility plants; service closets (meter, electrical, television, communication); boiler, chiller, generator or other rooms; mechanical and electrical equipment rooms; fuel rooms; elevator equipment rooms; air duct shafts; service chutes; stacks; or air ducts, pipe shafts, mechanical service shafts, service chutes, and areaways.

Basis for Measurement: Mechanical area is computed by physically measuring or scaling measurements from the *inside* faces of walls or partitions, or shafts, which enclose such areas. Vertical shaft areas shall be counted at each floor. (See architectural drawing of Mechanical Area on next page.)

Exclusions: Deductions should not be made for necessary building columns or architectural and structural projections. Areas designated as private toilets (which are assignable service rooms to primary rooms) are not included.

Note: For reconciliation purposes, campuses are advised to track and maintain separate records for Mechanical Areas which exist in typical buildings having Basic Gross areas and in covered unenclosed facilities.

Nonassignable: Parking Structure Area

Definition: That portion of the building which is used for private vehicle access, circulation, and parking, whether in parking or non-parking buildings or structures.

Description: Includes all relevant areas exclusively or primarily serving private vehicle parking.

Basis for Measurement: Private Vehicle Parking Area is computed by measuring from the *inside* faces of walls or partitions which enclose such areas. Vertical circulation space should be counted at each floor. Top, unroofed floors of parking structures are included, *only if* used for parking.

Exclusions: Institutional vehicle maintenance and service areas, as well as areas for storage of physical plant or farm operations service vehicles and motorized equipment, are counted as assignable area (see Room Use Codes 570-Field Building and 750/755-Vehicle Storage). Surface parking lots contiguous or related to buildings are excluded and, therefore, not reported as part of Nonassignable Parking Structure Area.

Note: Parking structures are not considered Covered Unenclosed Gross Area. Campuses should record measurements for parking structures and relevant parking areas as Basic Gross and Unrelated Gross Areas.

Net Usable Area

Net Usable Area is defined as 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. In other words, the aggregate interior area of a building which is known as the *Net Usable Area*, is the sum of Assignable Area (the sum of the ten assignable major room use categories) and Nonassignable Area (the sum of custodial, public toilet, circulation, mechanical, and private vehicle parking areas).

Structural Area

Definition: The sum of all areas on all floors of a building that cannot be occupied or put to use because of structural building features. Structural Area is also known as *Construction Area*.

Description: The difference between the exterior of the building and the interior or Net Usable Area is the *Structural Area*, the floor area upon which the exterior and interior walls sit and the unusable areas in attics and basements. Examples of building features normally classified as structural areas include exterior walls, fire walls, permanent partitions, unusable areas in attics or basements, or comparable portions of a building with ceiling height restrictions, as well as excavated basement areas.

Basis for Measurement: Precise computation by direct measurement is not possible under these definitions. Structural area may be calculated as Gross Area less the Net Usable area of a building. (See architectural drawing of Structural Area below - the grey and black walls are the structural areas.)

Basic Gross Area

Definition: The sum of all areas, finished and unfinished, on all floors of an enclosed structure (that is, within the environmentally controlled envelope), for all stories or areas which have floor surfaces.

Description: In addition to all the internal floored spaces obviously covered above, basic gross area should include the following: excavated basement areas and developed attics; mezzanines and penthouses; garages and parking structures; enclosed porches; inside balconies (used for operational functions); vertical circulation with and without floors (counted at each floor); mechanical and electrical shafts (counted at each floor); piers (structures only; count surface area of decking); and unfinished areas (e.g., unfinished basements or attics with floor surfaces).

Basis for Measurement: Basic Gross Area is computed by physically measuring or scaling measurements from the *outside* faces of exterior walls, disregarding architectural and structural projections (e.g., cornices, pilasters, buttresses) which extend beyond the wall faces. Within the envelope, vertical circulation area, whether floored or not, and vertical mechanical and electrical shafts should be counted at each floor. Vertical mechanical and electrical shafts located outside the envelope should be included as though they were inside the envelope. Also included are *parking structures*; include the top, unroofed floors of parking structures *only if* used for parking. (See architectural drawing of Basic Gross Area on next page.)

Exclusions:

Excludes covered unenclosed areas. Also excludes basements or attics without floor surfaces; all areas open to the weather (such as patios, uncovered porches or balconies, courts, lightwells, surface parking lots, playing fields); portions of upper floors eliminated by rooms or lobbies that rise above single-floor ceiling height; areas having less than a six-foot six-inch (6'6") clear ceiling height unless they can be properly designated and used as mechanical or custodial areas or the criteria of a separate structure are met. (See the section on *Buildings to be Included*, page C.1, in this appendix.)

Note: For leased facilities, report the amount of square feet contained in the lease agreement as the Basic Gross Area. Typically, the square footage in the lease agreement will be the Net Rentable Square Feet, which includes the Assignable Area being leased, plus a prorata share of the nonassignable area (e.g., public circulation areas, rest rooms).

Covered Unenclosed Gross Area

Definition: The sum of all covered or roofed areas of a building located *outside* of the enclosed structure; i.e., the environmentally controlled envelope, for all stories or areas which have floor surfaces.

Description: Includes covered, unenclosed corridors, walkways, porches, balconies, loading docks, bridges and arcades. The covered, unenclosed gross area of a building may contain nonassignable areas (i.e., custodial, public toilet, circulation, or mechanical areas) or assignable areas (e.g., central storage, central receiving). An example of covered unenclosed gross area with *nonassignable* area contained therein would be a covered, unenclosed walkway entrance to a building. The interior portion (or area within the *phantom* walls) of the structure would be recorded in the campus system as Circulation Area. The Circulation Area plus the Structural Area would equal the Covered Unenclosed Gross Area. An example of covered unenclosed gross area with *assignable* area contained therein would be a covered unenclosed central campus receiving area. The interior portion (or area within the *phantom* walls) of the structure would be recorded in the room file with the measured amount of assignable area and with the area classified as Room Code 760-Central Service.

Basis for Measurement: Covered unenclosed area is computed by measuring from the *outside* faces of the envelope and the outside faces of the building or edge of roof canopies provided floor surface or pavement extends to the drip line. Deductions shall not be made for free-standing columns or architectural and structural projections.

Exclusions: Parking structures or the portion of buildings for which there are private vehicle parking areas are not considered Covered Unenclosed Gross Area. Campuses should report private vehicle parking areas as part of Basic Gross Area and Unrelated Gross Area.

Outside Gross Area

Outside Gross Area is a system calculation based on campus-supplied Basic Gross Area and Covered Unenclosed Gross Area data. The corporate facilities database maintains two methods for calculating Outside Gross Area: *OGSF100* and *OGSF50*.

OGSF100, known as the *Federal* method, is used for data verification and editing purposes (e.g., to ensure the total assignable area of a building does not exceed the total gross area of a building) and for responding to Federal facilities surveys and

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inter-institutional data exchanges. Measured in terms of outside gross square feet,

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$OGSF100 = \text{Basic Gross} + 100\% \text{ Covered Unenclosed Area}$
off

OGSF50 is the method most often used by the University of California to report Gross Area. This data element is used when reporting Gross Area for capital and space planning and design purposes (e.g., development of capital budgets and preparation of project planning guides), for calculating Maintained Area for operation and maintenance of plant purposes, and for responding to State reporting requirements.

Measured in terms of outside gross square feet,

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$OGSF50 = \text{Basic Gross Area} + 50\% \text{ of the reported Covered Unenclosed Area}$
off

Efficiency Ratio

A primary use of Outside Gross Area data by capital planners and architects is for computing the *Efficiency Ratio* of a building. The Efficiency Ratio may be defined as the ratio of total Assignable Area to total Outside Gross Area of a building. It is calculated by dividing the Assignable Area by OGSF50 (OGSF50 = Basic Gross Area plus one-half of the reported value for Covered Unenclosed Gross Area).

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$\text{Efficiency Ratio} = \text{Assignable Area} / (\text{Basic Gross} + 50\% \text{ Covered Unenclosed Gross})$
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See the section, *Building Area Calculation Tables* (Tables 1A, 1B, and 2), in this appendix for sample calculations of Outside Gross Area, Net Usable Area, Structural Area, and Efficiency Ratio.

Unfinished Gross Area

Definition:

The sum of all floor areas of an enclosed structure (i.e., within the environmentally controlled envelope) which are not usable or assignable in their present state of completion.

Description:

Unfinished Gross Area is a part of and is to be included in Basic Gross Area. Includes unfinished floors or portions of floors; unfinished basements with floor surfaces.

Basis for Measurement:

Unfinished Gross Area is computed by measuring from the outside faces

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of the envelope and the inside faces of walls and partitions.

Exclusions:

Unfinished spaces with less than 6'6" clear headroom; unfinished basements without floor surfaces.

Unrelated Gross Area

Definition:

The total measure of any gross floor area which is associated with private vehicle access, circulation, and parking. This required corporate facilities data element is used to calculate Maintained Area.

Description:

Unrelated Gross Area is the portion of Outside Gross Area that is associated with private vehicle parking areas and the prorated share of Structural Area. Unrelated Gross may refer to an entire structure, where the structure is used primarily for private vehicle access, circulation, and parking (i.e., parking structures), or to portion(s), level(s), or area(s) of any building, where private vehicle parking areas are incidental to the predominant use of the building.

Basis for Measurement:

Unrelated Gross Area is computed by measuring from the *outside* face of walls which enclose floor areas used for private vehicle parking. In other words,

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Unrelated Gross Area = Private Vehicle Parking Area + Prorated Structural Area
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For CEFA reporting purposes, parking structures containing *no* assignable areas are reported *only* in the facilities building file. In this case, the Unrelated Gross Area will equal the Outside Gross Area of the building. For mixed use buildings which contain assignable, nonassignable, and private vehicle parking areas, the Unrelated Gross Area will be the portion (or subset) of Outside Gross Area related to Private Vehicle Parking Area and its prorated share of structural area. Refer to Sample Tables 3A and 3B in this appendix for calculation of Unrelated Gross Area.

Exclusions:

Institutional vehicle maintenance and service areas, as well as areas for storage of physical plant or farm operations service vehicles and motorized equipment, are counted as assignable area (see Room Use Codes 570-Field Building and 750/755-Vehicle Storage). Surface parking lots contiguous or related to buildings are not reportable as Unrelated Gross Area. Deductions shall not be made for free-standing columns or architectural or structural projections.

Building Area Calculation Tables

Although the tables shown on these next pages are not submitted to the Office of the President, they are included in this appendix to simplify the understanding and development of building area data for reporting in the corporate facilities system.

Tables 1A (without covered unenclosed gross area) and 1B (with covered unenclosed gross area) calculate the Outside Gross Area of a

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building using the OGSF100 and OGSF50 methods. Table 2 shows the calculations of Net Usable Area, Structural Area, and Efficiency Ratio. Tables 3A (with no covered unenclosed gross area) and 3B (with covered unenclosed gross area) demonstrates the calculation of Unrelated Gross Area for structures containing parking areas for private vehicles