**ZONING ORDINANCE ADVISORY COMMITTEE** **TUESDAY, OCTOBER 18, 2022**

**DALLAS DEVELOPMENT CODE AMENDMENT**

**FILE NO. DCA 212-006**

**Building Height Measurement** **Planner: Steven Doss, AICP**

**Request:** Consideration of amending the Dallas Development Code Sections 51A-2.102 Definitions, 51A-4.408 Maximum Building Height, and related sections to modify how building height is measured how grade is established and provide clarifications.

**Staff Recommendation:** Staff recommends approval of the proposed amendments and to move the item forward to City Plan Commission.

## Background:

*Please note, this case report is largely unchanged from the July 21, 2022 case report. At the July 21, 2022 ZOAC meeting, the Committee voted to hold the item under advisement in order for members to review the case report in detail prior to further discussion and action.*

These proposed changes to Chapters 51 and 51A originate in the Building Inspection Division and focus on the measurement of height, both the start and end points. For the starting point of measuring height, the current ordinance measures grade from the highest and lowest exterior corners of a structure instead of the finished ground surface elevations within six feet of the structure, which is inconsistent with how the "grade plane" is determined in the International Building Code (IBC) and the International Residential Code (IRC). Because most property owners dream of the building before obtaining professionally prepared grading plans and because the measurement of grade in the Dallas Development Code differs from international codes, Building Inspection staff must reject the first submittal of building elevations to revise how height is measured from Dallas' zoning definition of grade.

Staff often also requires professionally prepared grading plans to be revised to identify finished ground surface elevations at the corners of the structure. The current ordinance also requires that the City measure height differently than many area cities. The current definitions of height and grade requires multiple permit submittals for new construction which is timely, costly, and unconventional to deviate from international standards. The proposed changes would normalize the city's definition of height and grade, provide additional guidance on where height is measured at the top of a building, and provide additional guidance for allowable rooftop structures, while ensuring that few, if any, existing buildings are put into nonconforming status by the proposed amendments.

## Concerns from May 19 and June 23, 2022 ZOAC meetings:

At the May 19 and June 23, 2022 ZOAC meetings, the Committee discussed four areas for further study. Consideration of these areas resulted in significant changes to the original report and proposed amendments and are addressed throughout the remainder of the report.

1. Measuring height to the highest point of all buildings
2. Consistency in Average Grade Measurement
3. Aligning the definition grade in Dallas with International Building and Residential Codes
4. Distances between grade and first finished floor

## Summary of July 21, 2022 ZOAC meeting:

At the July 21, 2022 ZOAC meeting, staff briefed the proposed changes included in this report which incorporated the comments and concerns expressed at previous meetings from committee members, with stakeholders, and from interdepartmental staff. The Committee voted to hold the item under advisement in order for members to review the case report in detail prior to further discussion and action.

## Staff Analysis:

The Dallas Development Code currently defines building height from a unique definition of grade to different points on the roof based on the type of roof. Grade is, in part, defined as "the average of the finished ground surface elevations measured at the highest and lowest corners of a structure." The definition of grade was most recently amended by Ordinance No. 27334, adopted by Council on September 24, 2008, which added a clarification and criteria for what the finished ground surface elevation meant for the purposes of calculating grade:

> *FINISHED GROUND SURFACE ELEVATION means the ground surface elevation of the building site before any construction or the ground surface elevation as altered in accordance with grading plans approved by the building official. Finished ground surface elevation does not include:*
>
> *(A) fill material not necessary to make the site developable;*
> *(B) berms; or*
> *(C) landscape features.*

Lower Point of Measurement

The measurement from the average grade means that the Development Services Department must request a signed and sealed grading plan from a licensed engineer that verifies the grade. Although, this represents a significant cost to the applicant and often leads to delays in plan review while the department awaits submittal of the required grading plans, this grading plan is required for most developments other than single family and duplex new construction. The purpose of

amending the definition of grade is to bring it closer to the definitions of "grade plane" of the 2015 International Building Code[1].

Since Dallas currently measures grade from the highest and lowest exterior corners of a structure and the IBC and IRC measures grade plane as an average of finished ground level adjoining the building at exterior walls, when the ground slopes away from the structure, the two methods of calculating grade is inconsistent for designers and requires a lot of revisions during plan review for minimal differences. To address this inconsistency, staff has proposed amendments to take steps to more closely align to the IRC and IBC's methodology of determining a grade plane, but maintaining the practice of measuring the highest and lowest points, instead of the complicated math of averaging an unspecified number of grades along an unspecified number of exterior walls. The proposed realignment of the Dallas Development Code definition of grade is also a deterrent to developers who are trying to take advantage of our current definition of grade because the proposed amendments require the lowest points of the finished ground surface elevation within six feet of the building which lowers the average grade instead of measuring grade at the lowest exterior corner of the structure that then sharply drops off without lowering the measurement of grade. The provisions to exclude planters and other objects are still included in the definitions, so that loophole is also still closed.

Distances between grade and first finished floor

There was discussion of developments that artificially build up the site with fill material or that add a partially exposed basement to gain height advantages that would be inconsistent with surrounding properties. In consideration of these concerns, staff has added a tolerance between grade and the finished floor where most projects can utilize the simplified height measurement. In conjunction with the newly proposed tolerance, the more traditional methodology of measuring height from grade is also included to address projects that add large amounts of fill material or when the finished floor of the ground story is elevated more than 18 inches above grade with basements or otherwise. The rationale of making 18 inches the tolerance between grade and the finished floor is based upon crawlspaces for pier and beam foundations which could be significantly taller on a sloping site, but are generally 12 to 18 inches tall on the low side of those foundations.

Although the latest version of where to begin measuring height is more complex, it allows most developments on relatively flat sites and slab on grade foundations some flexibility to be consistent with the submitted elevation drawings which always shows a height of the structure measured from the finished floor. Staff recommends these amendments to be measured from the finished floor to simplify the review process and to maintain provisions to discourage developments that design structures with elevated finished floors to intentionally gain height advantages.

[1] GRADE PLANE means a reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building at the lot line or, where the lot line is more than six feet from the building, between the building and a point six feet from the building.

Upper Point of Measurement

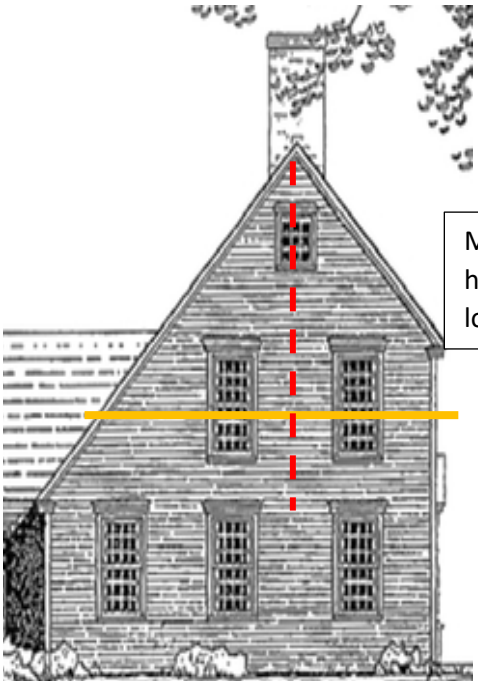
There was discussion to simplify the upper point of height measurement to the highest point of a structure, regardless of roof type. Staff considered adding this change with an added provision to 51A-4.408 to allow pitched roofs to exceed maximum height by a certain amount to not discourage pitched roof structures. However, staff does not recommend this method because a change in height definition in Chapters 51 and 51A and their corresponding maximum height provisions in 4.408 would not apply to customized districts (Planned Development Districts and Conservation Districts) that utilize the definition of height in Chapters 51 and 51A but otherwise specifically modify maximum structure height.

In other words, measuring height to the top of all structures would create nonconformities in many pitched roof structures in most custom-zoned areas of the City. Therefore, staff recommends maintaining the current system of determining the upper point of measurement by roof design, including midpoint of pitched roofs. Additionally, all comparative cities measure to the midpoint of pitched roofs and deviating from our current standard and how comparative cities measure height would create additional confusion and discourage pitched roof designs.

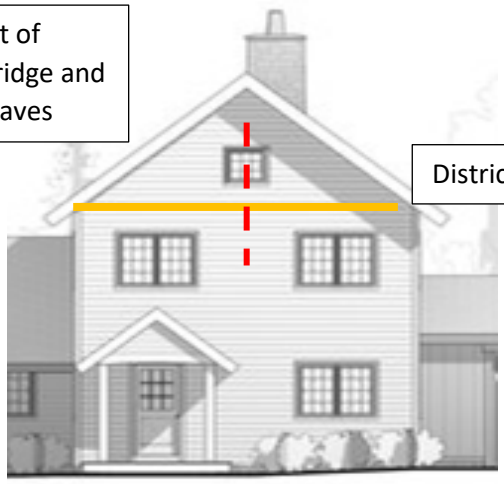
As with all potential code amendments, it is important to understand the potential nonconformities that could be created. Shed and gambrel roofs are the two primary roof types that might experience some nonconforming rights. Although shed roofs are usually measured to the highest point by current interpretation, some shed roofs may exist that were constructed with a different interpretation that would be made nonconforming by the proposed amendments because they only have one eave. There is also a potential for nonconformities in structures with gambrel roofs, but gambrel roofs are rare in the City. For both roof types, all of the usual legal nonconforming structure regulations and protections would still apply.

The primary purpose of amending the current definition of the upper point of building height is to eliminate inconsistencies, particularly in the case of pitched roofs with different eave heights as described in the following illustrations.

An interpretation of the current method of measurement



Midpoint of highest ridge and lowest eaves



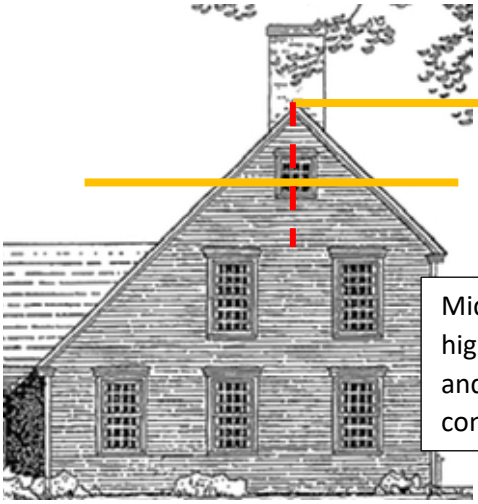
District Maximum Height

A

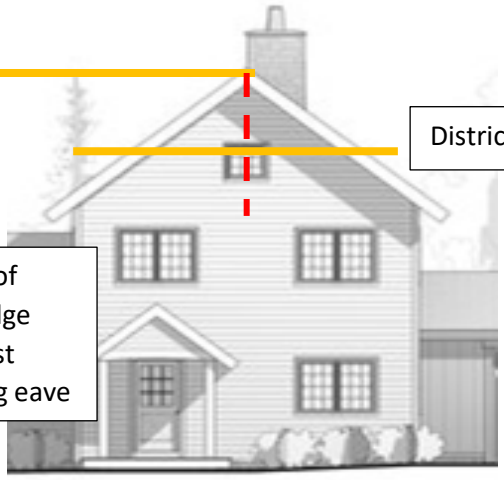
B

Currently, the height of a pitched roof is measured to the midpoint of the vertical dimension between the lowest eaves and highest ridge. By setting one eave much lower than the other, it is possible to artificially lower the point of measurement as shown in Building A above, which can lead to additional building mass above the maximum structure height.

Proposed method of measurement



Midpoint of highest ridge and highest connecting eave



District Maximum Height

A

B

Staff recommends measuring midpoint from the highest connecting eave instead of the lowest eaves to enhance consistency. Staff also recommends eliminating undefined terms, such as gable, hip, or gambrel, and instead listing the criteria to be considered a pitched roof which require the roof to have a minimum of two connecting eaves on each side of the ridge and a minimum roof pitch of 1:6 (rise over run).

Allowed Structures on Rooftops

In districts that limit building height to 36 feet or less, the current provisions in the Dallas Development Code allow for several structures to be located on rooftops and exceed the maximum structure height by a maximum of 12 feet, such as elevator bulkheads, mechanical equipment and its screening, and parapet walls. However, in comparative cities, these items are listed as exclusions to height in all districts. Staff recommends extending these exceptions to all districts and other modifications to these allowances based on plan review experience and historic interpretation, including allowing rooftop access to mechanical rooms to exceed the maximum structure height with added locational standards to prevent the appearance of an additional story and limiting the area of projection.

Staff recommends eliminating the allowance of a 12-foot clerestory projection because the traditional understanding of clerestories as being limited to windows which allow light into interior room are seldom proposed. Usually, clerestory windows are proposed on the exterior walls of contemporary structures and adds additional height at an exterior wall, which is inconsistent with the traditional intent of clerestories.

Finally, staff recommends including customary equipment such as lightning rods, small satellite dishes, weather veins, and similar equipment to the list of items allowed to project above maximum structure height since they contribute little building mass to structures.

Residential Proximity Slope Clarifications

Staff recommends realigning how RPS is calculated based on the proposed updates and deleting a note in Section 51A-4.408 related to structures allowed to exceed the maximum building height and residential proximity slope (RPS) height restrictions. The note is a conflict between district regulations which specifically state that structures listed in 51A-4.408(a)(2) are exempt from RPS restrictions. Deleting the note will eliminate the conflict and is consistent with how RPS is applied.

## Staff Recommendation:

Staff recommends approval of the proposed amendments and to move the item forward to City Plan Commission.

## Proposed Amendments

*Some definitions are omitted for brevity. Italics added to denote defined terms.*

**SEC 51A-2.102. DEFINITIONS.**

In this chapter, unless the context requires otherwise:

(8) BASEMENT means any story [~~level~~] of a *building* where more than one half of the vertical distance between floor and ceiling is below *grade*. For purposes of determining maximum stories, basements are excluded.

(37.1) FINISHED GROUND SURFACE ELEVATION means the ground surface elevation of the *building site* before any construction or the ground surface elevation as altered in accordance with grading plans approved by the building official. Finished ground surface elevation does not include:

(A) fill material not necessary to make the site developable;

(B) berms; or

(C) landscape features.

(45) GRADE means the average of the highest and lowest points of the *finished ground surface elevation* on a *building site* measured

(A) At the structure when the *finished ground surface elevation* is flat or slopes upwards or

(B) Within six feet of a *structure*, abutting *lot lines*, or *right-of-way lines*, whichever is nearer; including retaining walls and excluding areas located in a *floodplain* as defined by Article V; when the *finished ground surface elevation* slopes away from the exterior walls.

(C) When a site contains multiple *structures*, additions constructed in phases, or uneven ground story finished floor levels, grade is determined for each *structure*, phase, or ground story finished floor level ~~finished ground surface elevations measured at the highest and lowest exterior corners of a *structure*. For purposes of this definition, FINISHED GROUND SURFACE ELEVATION means the ground surface elevation of the *building site* before any construction or the ground surface elevation as altered in accordance with grading plans approved by the building official. Finished ground surface elevation does not include:~~

~~(A) fill material not necessary to make the site developable;~~

~~(B) berms; or~~

~~(C) landscape features~~].

(45.2) GROUND STORY means any *story* of a *building* or portion thereof with the lowest finished floor, excluding *basements*.

(47) HEIGHT means, [~~the vertical distance measured from grade to:~~]

(A) For a *structure* with a *ground story* finished floor,

(1) The measurement of height begins at:

(aa) the finished floor of the *ground story* when the finished floor is 18 inches or less above *grade*, or

(bb) *grade* when the finished floor of the *ground story* is greater than 18 inches above *grade*;

(2) The measurement of height ends at:

(aa) [~~(A)~~] for a *structure* with a pitched ~~[gable, hip, or gambrel,~~] roof, the midpoint of the vertical dimension between [~~the lowest eaves and~~] the highest ridge and the highest connecting eave, when the roof has a minimum of two connecting eaves on each side of the ridge and a minimum roof pitch of 1:6 (rise over run);

(bb) [~~(B)~~] for a *structure* with a dome roof, the midpoint of the vertical dimension of the dome; and

(cc) [~~(C)~~] for any other *structure*, the highest point of the *structure*.

(B) For a *structure* without a *ground story* finished floor, the measurement of height begins at *grade* and ends at the highest point of that portion of the *structure*.

**SEC 51A-4.408. MAXIMUM BUILDING HEIGHT.**

(a) Special height provisions.

*Omitted for brevity*

(2) In all [~~a~~] districts [~~in which building height is limited to 36 feet or less~~], the following *structures* may project a maximum of 12 feet above the maximum structure height specified in the district regulations (Divisions 51A-4.100 et seq.):

(A) *Structures* on top of a building:

(i) Elevator penthouse or bulkhead.

(ii) Mechanical equipment room and rooftop access structures, when:

(aa) the cumulative area of projection is a maximum of XX square feet when designed for individual dwelling units,

(bb) an additional setback is provided from the street-facing facades for that portion of the structure above the roof equal to one foot for each foot in height for that portion of the structure above the rooftop, and

(cc) every portion of this structure complies with residential proximity slope.

(iii) Cooling tower.

(iv) Tank designed to hold liquids.

(v) Ornamental cupola or dome.

(vi) Skylights.

(vii) Lightning rods, small satellite dishes, weather veins, and similar equipment [~~Clerestory~~].

(viii) Visual screens which surround roof mounted mechanical equipment.

(ix) Chimney and vent stacks.

(x) Amateur communications tower.

(xi) Parapet wall or guard rails limited to a height of four feet above the maximum structure height specified in the district regulations.

(B) Structures at grade level:

(i) Amateur communications tower.

~~Note: The heights allowed in Subsection (a)(2) are subject to any residential proximity slope height restrictions that may be contained in the district regulations for a particular district. (See Divisions 51A-4.100 et seq.).~~

(3) The maximum building height requirements in a planned development district are controlled by the planned development district regulations.

(4) In all [~~single family, duplex, townhouse, MF-1(A), MF-1(SAH), MF-2(A), and MF-2(SAH)~~] districts:

(A) no dormer eaves may project above the maximum structure height specified in the district regulations (Divisions 51A-4.100 et seq.); and

(B) the highest point of a structure with a pitched [~~gable, hip, gambrel, or dome~~] roof, as defined in Article II, may not project more than 12 feet above the maximum height specified in the district regulations (Divisions 51A-4.100 et seq.).

**SEC. 51A-4.412. RESIDENTIAL PROXIMITY SLOPE.**

(a) Definitions of general terms. In this section:

*Omitted for brevity.*

(b) Residential proximity slope defined. The residential proximity slope is a plane projected upward and outward from every site of origination as defined in Subsection (a). Specifically, the slope is projected from the line formed by the intersection of:

(1) the [~~vertical plane extending through the~~] boundary line of the site of origination; and

(2) the beginning point of the measurement of height [~~grade~~] of the restricted building or structure.

*Omitted for brevity.*

(e) Exemption. Certain structures are exempt from the residential proximity slope. See Section 51A-4.408.

## Appendix

San Antonio:

*Height, building. The vertical dimension measured from the average elevation of the finished lot grade at the front of the building to the highest point of ceiling of the top story in the case of a flat roof; to the deckline of a mansard roof; and to the average height between the plate and ridge of a gable, hip or gambrel roof.*

*Sec. 35-A101(b). - Definitions and Rules of Interpretation.*

Austin:

*(49) HEIGHT, when used in reference to a building, means the vertical distance from the average of the highest and lowest grades adjacent to the building to:*

*(a) for a flat roof, the highest point of the coping;*
*(b) for a mansard roof, the deck line;*
*(c) or a pitched or hip roof, the average height of the highest gable; or*
*(d) for other roof styles, the highest point of the building.*

*(45) GRADE means the horizontal elevation of a finished surface.*

*Sec. 25-4-21 - Definitions*

Fort Worth:

*(b) Except for multifamily dwellings developed in accordance with the unified residential development provisions of § 6.506, the height of a building shall be the vertical distance measured from the curb level to the highest point of the roof surface, if a flat roof; to the deck line of a mansard roof; and to the mean height level between eaves and ridge for a gable, hip or gambrel roof; provided, however, that where buildings are set back from the street line, the height of the building may be measured from the average elevation of the finished grade along the front of the building.*

*(c) Height in multifamily residential developments constructed in accordance with the provisions of § 6.506, unified residential development, shall be measured from the top of the finished slab to top of the highest wall top plate.*

*Sec. 6.100 Height.*

Houston:

*Height of the building means the vertical distance above a reference datum measured to the highest point of the coping of a flat roof or to the deck line of a mansard roof or to the average height of the highest gable of a pitched or hipped roof. The reference datum shall be selected by either of the following, whichever yields a greater height of the building:*

*a. The elevation of the highest adjoining sidewalk or ground surface within a five-foot horizontal distance of the exterior wall of the building when the sidewalk or ground surface is not more than ten feet above the lowest grade*
*b. An elevation ten feet higher than the lowest grade when the sidewalk or ground surface described in item (a) above is more than ten feet above lowest grade.*

*The height of a stepped or terraced building is the maximum height of any segment of the building.*

*Sec. 41-50. - Definitions*

Arlington:

*4.1.7. BUILDING HEIGHT*

*A. Measurement of Primary Structures The height of a building shall be the vertical distance measured from the average elevation of the finished grade along the front of the building to the highest point of the roof surface of a flat roof; to the deck line of a mansard roof; and to the mean height level between eaves and ridge for a gable, hip, or gambrel roof.*

*Sec. 4.1.7 Building Height*

Richardson:

*Height means the vertical distance of a building or portion thereof measured from the mean level of the ground surrounding the building to (1) the highest point of the roof's surface if a flat surface, (2) the deck line for a mansard roof, (3) the mean level for a shed roof, or (4) the mean level between eaves and the ridge for hip and gable roofs, and in any event excluding parapet walls not exceeding four feet in height, chimneys, cooling towers, elevator penthouses, mechanical equipment rooms, ornamental cupolas, standpipes, elevator bulkheads, domes or spires*

*Article I. Sec. 2. Definitions.*

Plano:

*Height*

*The vertical distance of a building measured from the average grade as measured at the corners of the building prior to berming to (1) the highest point of the roof's surface if a flat surface, (2) the deck line of mansard roofs or (3) the highest point of the ridge for hip and gable roofs and, in any event, including chimneys, cooling towers, elevator bulkheads, tanks, water towers, radio towers, antennas, ornamental cupolas, domes or spires, and parapet walls. (See Sec. 13.600)*

*Sec. 8.200 Terms Defined*

International Building Code (2015):

***GRADE PLANE**. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building at the lot line or, where the lot line is more than six feet from the building, between the building and a point six feet from the building.*

***HEIGHT, BUILDING**. The vertical distance from grade plane to the average height of the highest roof structure.*

SECTION 202 DEFINITIONS

## Image Sources

Building A – Saltbox Roof. familyhomeplans https://www.familyhomeplans.com/plan-52171

Building B – Front Gable Roof. William Merriman Architects
http://www.merrimanarchitects.com/products/small-traditional-sd