

RETAINING WALLS

PURPOSE

This interpretation has been developed to provide guidance as to when requirements of the National Building Code-2019 Alberta Edition (NBC(AE)) and a building permit apply to a retaining wall.

DISCUSSION

A retaining wall is defined by the Canadian Oxford Dictionary (2nd Edition) as a “wall supporting and confining a mass of earth or water”.

There are typically three different uses for retaining walls:

1. retaining walls that are directly associated with a building;
2. retaining walls that are a component of a development, or site grading; and
3. retaining walls as part of a transportation system.

Improper construction of a retaining wall may result in serious danger to persons and property and the NBC(AE) makes several references to retaining walls. Retaining walls that are critical to the stability of building foundations are regulated by the NBC(AE). Retaining walls that are not critical to the support of building foundations but are greater than 1.2 m in height may also be regulated by the NBC(AE) under specific conditions.

The NBC(AE) does not usually apply to retaining walls that are constructed as part of a road, rail or highway system infrastructure, which are separated from a building or group of buildings and not intended for public access.

All building projects regulated by the *Safety Codes Act (SCA)*, whether they require a permit or not, have to comply with the SCA. The SCA includes all regulations made under this *Act* and any code, standard or body of rules declared in force under this *Act*. The Permit Regulation sets out when a permit is required for any thing, process or activity regulated under the SCA. A permit is permission to undertake work and the inspection is the activity to determine compliance to the SCA and to the conditions of the permit.

Under the Permit Regulation, a building permit is required for construction of a building if the NBC(AE) applies to the thing, process or activity under construction. The SCA defines construction to include “alteration, installation, repair, relocation, demolition and removal.” Where retaining walls are regulated by the NBC(AE), a building permit is also required.

Unless stated otherwise, all Code references in this STANDATA are to Division B of the National Building Code-2019 Alberta Edition

Issue of this STANDATA is authorized by
the Provincial Building Administrator

[Original Signed]
Paul Chang

The logo for the province of Alberta, featuring the word "Alberta" in a stylized, cursive font with a small blue square at the end of the word.

Permit Regulation

Permit Regulation	Application
<ul style="list-style-type: none"> Section 6(1)(a) provides authority for requiring a building permit if the National Building Code-2019 Alberta Edition applies to the construction of a building or a change in the occupancy classification of the building. 	<ul style="list-style-type: none"> Section 1(1)(g) of the SCA defines “construction” to include alteration, installation, repair, relocation, demolition and removal. Any of these activities involving a retaining wall regulated by the NBC(AE) would require a building permit.
<ul style="list-style-type: none"> Section 6(3) sets out exemptions from the requirement for a building permit. Section 6(3)(a)(ii) provides an exemption for construction that does not exceed \$5,000 in prevailing market value. Section 6(3)(a)(iii) provides authority that a permit is not required if matters affecting health and safety are not at risk. 	<ul style="list-style-type: none"> Exemptions from the requirement for a building permit typically apply to workmanship activities, stages and tents of a certain size, specific installation replacements (furnace ducts) and construction that does not exceed \$5,000. Construction, in the opinion of the safety codes officer or permit issuer, that places health and safety at risk may require a building permit even if the cost of the project is less than \$5,000.

CODE REFERENCES

Article 1.4.1.2. of Division A states:

<p>Building means any structure used or intended for supporting or sheltering any use or occupancy.</p> <p>Foundation means a system or arrangement of <i>foundation units</i> through which the loads from a <i>building</i> are transferred to supporting <i>soil</i> or <i>rock</i>.</p> <p>Occupancy means the use or intended use of a <i>building</i> or part thereof for the shelter or support of persons, animals or property.</p> <p>Unsafe condition means any condition that could cause undue hazard to the life, limb or health of any person authorized or expected to be on or about the premises.</p>
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Sentence 4.1.4.1.(6) and the associated appendix note state:

<p>4.1.4.1. Dead Loads</p> <p>...</p> <p>6) Except for structures where the <i>dead load</i> of <i>soil</i> is part of the load-resisting system, where the <i>dead load</i> due to <i>soil</i>, superimposed earth, plants and trees is counteractive, it shall not be included in the design calculations. (See Note A-4.1.4.1.(6).)</p> <p>A-4.1.4.1.(6) Counteracting Dead Load Due to Soil. Examples of structures that traditionally employ the dead load of soil to resist loadings are pylon signs, tower structures, retaining walls, and deadmen, which resist wind uplift and overturning in light structures.</p>
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Sentence 9.3.2.9.(4) and the associated appendix note state:

9.3.2.9. Termite and Decay Protection

...

4) Structural wood elements used in retaining walls and cribbing shall be pressure-treated with a preservative to resist decay, where

- a) the retaining wall or cribbing supports ground that is critical to the stability of *building foundations*, or
- b) the retaining wall or cribbing is greater than 1.2 m in height.

(See Note A-9.3.2.9.(4).)...

A-9.3.2.9.(4) Protection of Retaining Walls and Cribbing from Decay. Retaining walls supporting soil are considered to be structural elements of the building if a line drawn from the outer edge of the footing to the bottom of the exposed face of the retaining wall is greater than 45° to the horizontal. Retaining walls supporting soil may be structural elements of the building if the line described above has a lower slope.

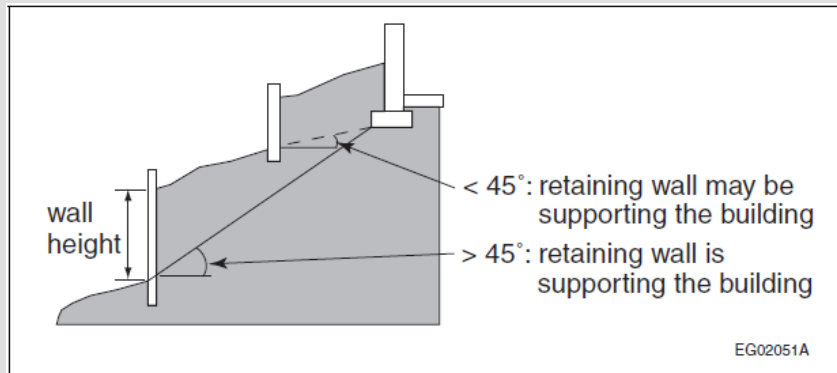


Figure A-9.3.2.9.(4)

Identifying retaining walls that require preservative treatment

Retaining walls that are not critical to the support of building foundations but are greater than 1.2 m in height may pose a danger of sudden collapse to persons adjacent to the wall if the wood is not adequately protected from decay. The height of the retaining wall or cribbing is measured as the vertical difference between the ground levels on each side of the wall.

Article 9.4.4.5. states:

9.4.4.5. Retaining Walls

- 1) Walls shall be designed to resist the lateral pressure of the retained material.

Article 9.4.4.6. states:

9.4.4.6. Walls Supporting Drained Earth

(See Note A-9.4.4.6. and 9.15.1.1.)

1) Except where constructed in accordance with Section 9.15., walls supporting drained earth shall be designed

- a) for a pressure equivalent to that exerted by a fluid that has a density of not less than 480 kg/m³ and a depth equal to that of the retained earth, or
- b) in accordance with Section 4.2. so as to be able to resist the loads and effects described in Article 4.1.2.1.

2) Walls supporting other than drained earth shall be designed

- a) for the pressure described in Clause (1)(a) plus the fluid pressure of the surcharge, or
- b) in accordance with Section 4.2. so as to be able to resist the loads and effects described in Article 4.1.2.1.

1. Article 9.8.8.1. states:

9.8.8.1. Required Guards
(See Note A-9.8.8.1.)

1) Except as provided in Sentence (2), every surface to which access is provided, including but not limited to *flights* of steps and ramps, exterior landings, porches, balconies, *mezzanines*, galleries and raised *walkways*, shall be protected by a *guard* on each side that is not protected by a wall for the length where

- a) there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface, or
- b) the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.

2) *Guards* are not required

- a) at loading docks,
- b) at floor pits in repair garages, or
- c) where access is provided for maintenance purposes only.

...

INTERPRETATION

The following uses of retaining walls are regulated by the *Safety Codes Act* and the NBC(AE) and require a permit and inspection for compliance to the *Act*:

- 1) Retaining walls critical to the support of building foundations.
 - a. Retaining walls supporting soil are considered to be structural elements of the building if a line drawn from the outer edge of the footing to the bottom of the exposed face of the retaining wall is greater than 45° to the horizontal.
 - b. Retaining walls supporting soil may be structural elements of the building if the line described in clause (a) above has a lower slope. This situation should be evaluated by a registered engineering professional licensed to practice in the province of Alberta.
- 2) Retaining walls that exceed 1.2 m in height, provided the retaining wall is:
 - a. adjacent to public property;
 - b. adjacent to an access to a building; or
 - c. on private property which is accessible to the public.

Guards conforming to Article 3.3.1.18. or Section 9.8. of the NBC(AE) are required at the top of any retaining wall, where the upper surface supported by the retaining wall is used to provide support for pedestrian traffic, and there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface.

This INTERPRETATION is applicable throughout the province of Alberta.